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In the Beginning. . .The Genesis of the St. John's Program, 1937

Charles A. Nelson

The transformation of St. John's College in 1937—with the introduction of what was then, and for many later years, called the New Program—set on foot a way of learning and teaching that has now enfolded, inspired, and perplexed students and teachers for lo these sixty-eight years. I shall attempt to describe and explain what took place here on this campus in 1937. Let me say parenthetically that this is not an exercise in nostalgia, a yearning for “the good old days.” On the contrary, I can assure you that the College is much stronger now than it was then, the faculty is better, and the entering students are, on the whole, smarter, a bit better educated, and a lot better looking!

On Tuesday, September 21, 1937, the student newspaper here in Annapolis, announced that, under the new leadership of Stringfellow Barr as president and Scott Buchanan as dean, the fall term would open with a “different set-up” for the arriving freshman class.

A different set-up indeed! Probably no other educational institution anywhere has undertaken so radical and so swift a transformation as took place at St. John's in the eighty-three days between July 1, 1937, when Barr and Buchanan took office, and September 22, when the fall term began. Before describing what took place on this campus that summer and fall, I will provide some of the context by recounting activities of our two “transformers” in the preceding years. Perhaps as good a place as any to begin is at the University of

This lecture was delivered at St. John's College, Annapolis, September 30, 2005. Mr. Nelson is the author of three books about the founding of the Program at the College and about the founders, Stringfellow Barr and Scott Buchanan.

Virginia at Charlottesville, and then to go backwards and forwards from there.

Stringfellow Barr had been a history teacher at Virginia since 1924, and, since 1930, a full professor and the editor of the *Virginia Quarterly Review*. Buchanan had been teaching philosophy there since 1929.

Before Buchanan was appointed to the faculty, Barr had been consulted. He recalls:

The head of the philosophy department accosted me and asked what I knew about Scott Buchanan . . . I said, "He's the most remarkable man I've ever met, but he's not an easy person, and I would rather not urge his appointment. It would mean a great deal to me personally to have him here, but . . . you might find him a very difficult customer to handle." They decided to risk it and got him.

Despite that rather ambiguous endorsement, the friendship prospered. Both men developed formidable reputations as teachers. They also shared a deep concern about the inadequacies of the undergraduate curriculum. Buchanan reported that "The college at the University was being squeezed, exploited, and reduced to the size and functions of a secondary preparatory school for the graduate schools."

This concern was sufficiently widespread that it led President John Holcomb, in 1934, to appoint a Committee on Honors Courses. He asked both Barr and Buchanan to serve. This small group of six met almost weekly for a period of about six months and issued its report in March 1935. The report has three sections. The first is an exposure of the grave weaknesses of the existing undergraduate curriculum, drafted by Barr. It must have offended many members of the Virginia faculty more senior than he. Here is an excerpt:

The able student, on his part, feels. . . that many of the lectures now given are not worth listening to

and that the textbooks assigned are not worthy of serious study. In his more charitable moods, he recognizes that, given the present student body, the professor is not much to blame. Observing this low morale on the part of both professor and student alike, the publishers have done their best to supply increasingly "easy" texts. . . . The self-respecting professor has consoled himself with research. . . . Or he has found consolation in graduate courses in which "real work" may be attempted. . . . The able undergraduate has turned to athletics and other "activities". . . . He comes to look on the strictly curricular exercises of the university as interruptions that must be borne patiently but which he quite sees through. . . .

The second section of the report is a detailed plan for a two-year "college within the college," a required program of tutorials, laboratory work, lectures, and discussions, all based on the reading of the great books of the Western tradition, including a substantial number of mathematical and scientific works. This section was written by Buchanan. The range and depth of the plan are extraordinary; it bears a strong resemblance to the program installed here at St. John's.

Buchanan contended that the best materials for the proposed curriculum are the literary and scientific classics of Europe. He states that "all instruction will be based on the reading, analysis, interpretation, criticism, imitation, and discussion of the books in the following list." That list includes over a hundred authors, and it will look familiar to anyone with a St. John's connection. When the report was circulated on the Charlottesville campus, the most startling feature, I feel sure—apart from the very notion of an all-required two-year program for a select twenty of the best undergraduates—is the inclusion on this list of numerous works in Mathematics and Science, a grand total of forty-two titles, ranging from Euclid, Nicomachus, and Hippocrates to

Darwin and Faraday and Lobachevski and Mendel, and including those giants Ptolemy, Copernicus, Galileo, Kepler, Newton, and Harvey.

In Winfree Smith's insightful book *A Search for the Liberal College*, published by St. John's in 1983, he comments on Buchanan's proposal:

When one considers that the plan was to read in two years almost as many books as St. John's undergraduates now read in four years, and to read in their entirety books many of which are now read at St. John's only in part, and that list contained Thomas Aquinas' *Summa Theologicae*, Part I, Newton's *Principia*, Kant's *Critique of Pure Reason*, Hegel's *Phenomenology*, Maxwell's *Treatise on Electricity and Magnetism*, etc., one sees the impossibility of the task.

To that one might add that there were also included works not so inherently difficult, but very long—Gibbon's *Decline and Fall of the Roman Empire*, the Bible, Marx's *Capital*, Dante's *Divine Comedy*, Tolstoi's *War and Peace*.

What Buchanan in this report called the "machinery of instruction," was to be conducted in four modes: once-a-week discussion of the assigned reading for the whole class (of no more than twenty), with two instructors in charge; formal lectures at least once a week, based on the expository texts; tutorials in languages and mathematics, for "formal drill and supervised practice," and for detailed criticism and discussion of student papers; and a laboratory "equipped for the performance of the crucial experiments in the history of science, for the practice of the arts of measurement and experimentation, and the illustration of scientific theory."

The full report, including a third section on the elective portion in the third and fourth years, was submitted to President Newcomb in March 1935—and that was the end of it! The country had not yet emerged from the Great Depression, and the Committee report was shelved, at least in

part, for lack of funds. But in retrospect one can readily imagine how Buchanan's plan would have been chopped to pieces department by department if it had ever emerged as a serious proposal.

So by this time, Barr and Buchanan had developed not only a deep conviction of the necessity for college curricular reform but also this specific plan for its radical transformation. It was no doubt frustrating to have worked so hard and so productively in developing their proposal and to see no result. (If it can be said that a seed was planted at Virginia, it must be added that the seed was not nurtured there, and a transplant would be required to keep it alive and growing.)

Meanwhile, at the University of Chicago, what appeared to be a more favorable climate for curricular reform had been created by President Robert Maynard Hutchins. He had earlier enticed Mortimer Adler and Richard McKeon from Columbia, and Adler had persuaded Hutchins to invite Barr and Buchanan to come and join Hutchins' Committee on the Liberal Arts. They accepted, though Barr was reluctant to leave his native Virginia and the University he loved in spite of all its shortcomings. Although there was considerable muttering on the Chicago campus about Hutchins' unconventional opinions and appointments, it soon transpired that the Committee members themselves were the chief cause of what turned out to be a farcical failure. Buchanan's account is especially interesting:

The first meeting of the Committee on Liberal Arts will never be forgotten by any of those present. It was one of those occasions of recognition that mark the crises in tragedies and comedies. . . and in spite of many interchanges of lectures and papers, McKeon, Adler, and I, each of us, had constructed . . . quite different universes of discourse. . . Heat and light became thunder and lightning. There was never another general meeting of the whole

committee. We agreed to disagree and to pursue our separate courses. . . .

One significant outcome of that year's work at Chicago was the effect on Barr of his seminar readings with Buchanan. He says in one of his oral history interviews, "We read the dialogues of Plato. . .and we read the whole of Euclid's *Elements*. . .I've been saying ever since. . .that I would never have touched St. John's if this hadn't happened."

Chicago was, to say the least, another very frustrating experience for both Barr and Buchanan. Later Adler claimed that the seeds of the New Program at St. John's "were sown in the meetings of the Committee on the Liberal Arts at the University of Chicago in 1936-37," but he is wrong on two counts. The seeds were sown at Virginia, or earlier, and the year at Chicago added virtually nothing to the conception of the New Program that emerged here in 1937.

In the same academic year, 1936-37, an event occurred in Buchanan's life that appeared to be totally unrelated to his pursuit of educational reform but that turned out to be the key that unlocked the door. He accepted an invitation to a meeting of "Christian leaders" in Alexandria, Virginia, in May, 1937, to discuss how to combat the rising threat of Fascism and Communism in Europe. Buchanan shared a room with a friend, Francis Pickens Miller, and they soon got to talking about the state of college education. Miller had recently agreed to serve on the Board of Visitors and Governors of St. John's, and the trustees were looking for new leadership for an institution in deep trouble. It was not long before Miller arranged a meeting between Barr and Buchanan, on the one hand, and the College trustees on the other, followed by a full day's discussion with Richard Cleveland, then secretary and later chairman of the College board. An offer soon came, and so it was that Barr, reluctantly, and Buchanan, more hopeful, but no doubt with reservations, agreed to come promptly to St. John's. Less than two months after the Miller-Buchanan conversations in

Alexandria, Barr and Buchanan were installed at St. John's. The world was not thus saved for democracy, but this college found a new life.

A few words first about the college they found on arrival here in the fall of 1937. The president, Amos Woodcock, had just cost the college its accreditation by awarding a bachelor's degree to a senior against the judgment of the faculty. The dean, a retired Navy captain, was formerly director of the Naval Academy's athletic program. Although there were only twenty-four faculty members, fifteen majors were available. There was just one faculty member in each of the departments of Art, German, Classics, Spanish, Government, Philosophy and Psychology, and Physics. There were four national and two local fraternities. Intercollegiate athletic schedules were maintained in football, basketball, and lacrosse.

St. John's thus had a conventionally organized but weak academic and extracurricular program. Lest it be thought a hopeless case it is worth remembering that among the faculty who made a successful transition to the New Program were the very able Ford K. Brown and Richard Scofield, both themselves Rhodes Scholars; John Kieffer, a Greek and Latin scholar with a Harvard education; and the mathematician George Bingley.

When Barr and Buchanan took over the all-but-bankrupt college, they prescribed a four-year curriculum alike, in all important respects, to that now in place here and in Santa Fe. In the sixty-eight years since its inception, the "bones" of what was then called the New Program—seminars on the great books, language and mathematics tutorials, laboratory, and a weekly all-college formal lecture—have not changed. Significant refinements have taken place, however, as the curriculum has undergone constant review. The most important of these are probably (a) in the language tutorial, instead of one year each of Greek, Latin, French, and German, the current pattern is two years of Greek followed by two years of French; (b) Music has found a solid place in

the required program; and (c) the preceptorial has been introduced.

An equally radical—perhaps even more radical—alteration in the modes of instruction accompanied the curricular revolution. In the seminar, which became the heart and soul of the program, a group of eighteen to twenty students sat facing one another around a long, wide table and discussed a book read by all. The two faculty members in charge took turns opening the discussion with a question (not “When did Plato write this dialogue?” but perhaps, “What is justice?”). In the conversation that followed, students and tutors together sought answers by reviewing and analyzing, for instance, the conflicting definitions of justice debated in the first book of the *Republic*.

The New Program called for a complete transformation of the structure and functions of the faculty. There were no longer any departments, ranks, or specialization. Of course this raised questions of status and dignity and inevitably raised the question of whether Buchanan was the leader of the faculty so desperately needed—or simply out of his mind! Each new member and every retained member of the existing faculty became a “tutor” and was offered the opportunity, as well as the challenge, of learning how to teach throughout the curriculum. Could a physicist learn to teach Greek and to discuss Plato’s *Meno*? Would a philosopher be willing to study the conic sections of Apollonius or to dissect a frog in the laboratory? Was this too much to ask of self-respecting teachers with credentials from Oxford, Columbia, Princeton, and Harvard? And there were no tenure appointments to the faculty during the Barr-Buchanan years.

In the space of two years, all intercollegiate sports were discontinued and were replaced by an intramural program designed to attract and involve everyone. The fraternities, too, were abolished, and their entryways on the campus buildings where they had been housed were renamed by Barr in honor of the four Maryland signers of the Declaration of

Independence—William Paca, Charles Carroll of Carrollton, Samuel Chase, and Thomas Stone.

Although both Barr and Buchanan hoped that their plan would inspire other colleges to follow their lead, they did not want it to be universally copied, even if it were feasible to do so. That would have left the entering freshman without a significant choice, and the freedom to choose the St. John’s path is essential to its success. The discipline and commitment required in order to gain the rewards of the program presupposes that the path is freely chosen. In fact, I believe that most alumni would assert that it must be not only freely chosen, but also pleasurable; otherwise, it isn’t worth the pain.

Buchanan was convinced that an understanding of modern science was essential to the liberal education of the modern man or woman, and that in turn required an understanding of—among other things—Newtonian physics. Newton’s *Principia* appeared to be inaccessible to the average college student. How could it be made accessible? Buchanan made it accessible by plotting a chronological course of study through mathematics, physics, and astronomy, beginning with Euclid’s *Elements* and proceeding through the works of Apollonius, Ptolemy, Copernicus, Galileo, and Kepler, along with straight mathematical exercises and accompanying laboratory work.

The decision to abolish academic departments had several consequences. First, Barr and Buchanan were able to assert and dramatize their shared conviction that every faculty member should establish as a goal, no matter how long it would take to reach it, to teach across the curriculum, to transcend his or her specialty, to aim to become a liberally educated person.

Equally important, the abolition of the departments and divisions broke through one more barrier to the direct confrontation of a book by the student. A reading of Plato’s *Republic*, for instance, would not be filtered through the lens of political science, or philosophy, or history, or theology; the work would speak for itself. It would not be categorized and

thus prejudged. The student was to confront each author and each work in its own right. Except for the necessity of reading most of the books in translation, there would be no intervention between the author and the reader. It is this radical departure that allows the College to claim that the great books are the teachers, the primary faculty within which the tutors and their students are learners together, with the tutors as the more seasoned guides.

Lessons Learned, Lessons Applied

The transformation wrought by Barr and Buchanan here in 1937 seemed nearly miraculous to some (and errant nonsense to others!). But in fact it was in part an incorporation of lessons learned not only early in their lives, but especially during the eighteen year period from their arrival as Rhodes Scholars at Balliol College, Oxford, to their arrival in Annapolis. I add only that they came to St. John's not just with lessons learned, but with that indispensable daring and conviction without which the sturdy structure that now flourishes here and in Santa Fe sixty-eight years later, would not have survived the first winter.

Perhaps at this point you have some curiosity about these two "transformers," Stringfellow Barr and Scott Buchanan. What were they like? What did they do before Charlottesville and Annapolis?

Barr—Growing Up

Stringfellow Barr, known to his family and friends since infancy as "Winkie," was born and grew up in Virginia, the son of an Episcopalian bishop, and the grandson, on his mother's side, of Franklin Stringfellow, famous in Virginia as a daring cavalry scout for Jeb Stuart and Robert E. Lee. After the war Grandfather Stringfellow became a country parson, and a man of simple convictions. Barr recalled: "He said. . .that

he didn't want to go to heaven if Dixie (his horse) wasn't there."

Winkie grew up under the engaging influence of that celebrated grandfather and of his learned and devoted father who introduced him to Dickens, Shakespeare, and the Bible. He recalls reading all of *Oliver Twist* out loud to his older sister, Jane, when he was eight or nine. Even earlier, when he was five or six, he had begun reading the Bible to the black servants in the kitchen. And then, he says,

On my tenth birthday. . .Father gave me a Shakespeare play. . .He said, "You won't understand this well when you read it, but keep reading it." So I did. I'd do anything for him. . .I adored him. . .I was so taken with *Macbeth* I wanted to express myself somehow, but the thing that I was taken with was not *Macbeth*, for God's sake, it was King Duncan. He was the first king I ever met . . .I had been given. . .a funny little kimono-sort-of-garment with a blue and white design on it, with a belt. . .I would put this on, not over my pajamas or anything, I'd walk rapidly across the room so that the train would float better behind. . .This had the disadvantage of leaving my belly completely exposed, but nobody gave a damn.

It will not surprise you that this boy then grew up, went to college and graduated from the University of Virginia at Charlottesville. When Barr received his B.A. in 1916 he was nineteen years old, and had behind him four years of Latin, three years of Greek, eight years of English and English Literature, and an abundance of extra-curricular activity. He was awarded a Rhodes Scholarship in 1916—not surprising. But the Brits were deep in the first World War, so he did not take up his Rhodes until three years later. During that period, several dramatic events shaped and matured him. In April, 1917, the United States entered the war against Germany. Conscription had not yet begun, but Barr promptly enlisted

in the Army in May. He was transferred to an ambulance corps training at Allentown, and, expecting a quick trip overseas, he began intensive study of French. But it turned out that the Army had no vehicles available for ambulance training; so Barr, severely flat-footed and unable to do the foot-soldier drill, was transferred to the Sanitary Corps, which was organizing instruction about venereal diseases, "not a very glorious assignment, and not one I coveted." His talents as a speaker and writer continued to be appreciated. When he spoke to recruits about the dangers of "the clap," he composed entertaining verse designed to catch their attention. Many, like Barr, frustrated and disappointed, were never sent overseas.

And so, Winkie Barr, having enlisted out of a sense of duty, having suffered the humiliation of unfitness for combat service, and having prepared uselessly to be an ambulance driver in France, made the best of his assignment to teach recruits the risks of venereal disease. And, somehow, he managed to do that with a light heart!

Then, immediately after his discharge from the Army, he was called upon to undertake what he called "the most painful adventure of my whole life." His adored father suffered a mental and physical collapse, requiring Winkie's services as an attendant to him at a mental hospital in Asheville. Perhaps miraculously, after six months of daily round-the-clock attendance, his father recovered, and was able to return home.

So when the Armistice was signed in November, Barr was free to take up his Rhodes Scholarship at Balliol College, Oxford. At age twenty-two, a young man of some experience.

Buchanan—Growing Up

Meanwhile, what about Scott Buchanan? A markedly different sort of person with a markedly different set of childhood and youthful experiences.

Born in a small town near Spokane, Washington, Scott, an only child, was soon carried by his parents across the continent to Jeffersonville, Vermont, where his father, a country doctor, soon died. The boy was then just seven years old. His mother and he were left in near poverty.

In an interview many years later, Buchanan recalls his early education:

Jeffersonville was a small town, probably not over a thousand inhabitants. There was a schoolhouse in the middle of town next door to our house. . . . It was a curious school, with four rooms that included everything from the first grade through high school. There were three grades in each room and recitations were held in front of the room in rotation. From the very start I was listening to classes ahead of me and then, as I went on, to classes behind me. So I had a sort of triple education. . . .

I had to prepare my own work but I was always watching the teaching and learning. . . .from the other classes as I went on. It made me realize very early how much teaching goes on between students. . . .Since then I've always seen a classroom as a very lively relationship between mutual teachers.

In his youth, Buchanan was an earnest Christian and a "great church-goer." "I used to count five times on Sunday that I did something at the church." Young Scott had been converted by a visiting evangelist and "they took me in as a member of the church at the age of eight. I don't think that is

often done but Congregationalists are free-wheeling. . . .Then after that I began having doubts, of course. . . .By the time I was in high school. . . .I refused to take Communion. . . .I didn't understand why you should eat bread and drink wine because it was the body and blood of Christ." (I recall Buchanan saying in my language tutorial in 1941-42 that "hocus pocus" was a corruption of Jesus' saying at the Last Supper, "Hoc est corpus meus.") These recollections may suggest that Scott's young life was consumed with religion and personal reflections on the meaning of Christian doctrine. As evidence to the contrary, he later recalled how much he missed the winters and the ice skating in northern Vermont.

Amherst College was a natural destination for Buchanan, and he was admitted there, no doubt on scholarship, in 1912. By a happy accident it was the very year that the estimable Alexander Meiklejohn joined Amherst as President. Somehow a bond developed between them despite a twenty-three year age difference. And when Meiklejohn brought together in his study five or six members of the faculty for a reading and discussion of Immanuel Kant, the undergraduate Buchanan was invited to join. The two became lifelong friends. (When I say "the two," I mean Meiklejohn and Buchanan, but I might as well have said Buchanan and Kant.)

Scott Buchanan had a good academic record at Amherst. He won the mathematics prize in his sophomore year and the Greek prize in his junior year, he was the Ivy Orator at his commencement and received his degree *cum laude*, and, most notably, he was awarded the Rhodes Scholarship from Massachusetts.

The United States entered the Great War in 1917, and, in 1918, Buchanan signed up for the Navy, though a pacifist and a conscientious objector. Although he didn't want to fight, he thought it was wrong to escape what his college friends, who had been drafted, were going through. In any case, after the Armistice was signed in November, 1918, Buchanan was

discharged from the Navy, leaving him free to take up his Rhodes Scholarship.

Barr Meets Buchanan

And thus it happened that our two "transformers" met for the first time at Balliol College, Oxford, in the fall of 1919. Barr remembered vividly their first encounter:

There was a knock and I opened my door.
"Hello," he said, "I'm Scott Buchanan,
Massachusetts." He stood, smiling, relaxed, his
head a little on one side. He wore the heavy tweed
jacket and gray flannel "bags" that I was beginning
to recognize as the Oxford student's favorite
costume. . . .[He said]: "I'm looking for Barr,
Virginia."

Thus began a friendship that lasted until Buchanan's death forty-nine years later. But it had a rocky beginning. Perhaps that is partly because Barr did not quite realize at first that he was in the process of becoming Buchanan's student. After all, they were Rhodes Scholars together, and, although Buchanan was two years older, they had graduated from college only a year apart. But Barr discovered that the best conversations seemed to take place when Buchanan was on hand, and later, during Buchanan's last term, an informal seminar developed, in which Barr and several Englishmen began to meet regularly in a discussion group led by Buchanan. Barr recalls:

It was his curious kind of questioning that bound
them and me. . . .I had quite simply been snared
into Platonic dialectic, by a dialectician who had
staked his life on Socrates' statement that the
unexamined life is not worth living, a dialectician
who may already have agreed with that stately first

sentence in Aristotle's *Metaphysics*: "All men desire to know."

Buchanan later reported that during those Oxford years he and Barr "had spent long hours in talk about the plight of American education." He did not say explicitly what the conversations encompassed, but the context suggests that one of their main concerns was that the growth and dominance of the graduate schools in the American universities was turning the undergraduate years into preparation for specialization instead of cultivating the liberal arts.

From Balliol and Oxford, Buchanan and Barr borrowed the "don-rag." In one of his letters to Meiklejohn from Balliol, Buchanan describes it briefly: "Our term closed on Monday," he wrote, "with what is called a 'don-rag.' One goes before his tutor and the Master to hear his work commented on and discussed in approval or encouragement for better work in the future." Barr, years later at St. John's, refers to "a device we stole from English university practice, the device which British undergraduates term a 'don-rag,'" and then goes on to describe what "we have adapted . . . more nearly to our needs," an adaptation with which most of you are quite familiar.

Also, they borrowed the title "tutor," and made the tutorial not, as at Oxford, a weekly meeting of one or two students with a tutor to discuss a paper prepared by the student, but a small group of eight to ten students meeting daily to study language and mathematics. (And let me interpolate here: it appears that Buchanan and Barr *borrowed* liberally, but they never *copied*; whatever they took underwent a Buchanian twist.)

They also took the best of the informal discussions that had enriched their lives at Balliol and transformed them into the "seminar," in which the size of the group was limited to twenty or so, in order to ensure the primacy of student participation and, by using two tutors, to counterbalance any tendency, on the part of either, to impart "the truth."

Oxford encompassed many colleges of varying sizes. A "large" college might have as many as 450 resident students. St. John's in the 1940's shrank to almost nothing during the war years, and didn't reach 300 even after the war. But now St. John's, by Oxford standards, is a large college! Barr and Buchanan, despite the experience of Amherst, Harvard, and the University of Virginia, thought that the Oxford colleges were about the right size.

After graduate work at Harvard and two years teaching philosophy at City College, New York, Buchanan, in 1925, with a Harvard doctorate in hand, began four stimulating years at the People's Institute at Cooper Union in New York. He enjoyed providing adult programs for first—and second—generation European immigrants who were not looking for credits or degrees, but seriously interested in learning.

Perhaps of greater import for our current concerns, he organized with the New York Public Library, eighteen great books seminars meeting in library branches around the city, which were led by instructors or recent graduates from Columbia. These seminars no doubt confirmed his conviction that the great books were accessible to a wide readership of serious, intelligent readers, and should not be considered the exclusive preserve of university scholars.

This was also a time of invention, exploration, and experimentation in the undergraduate program at Columbia, where Mortimer Adler, Mark Van Doren, and Richard McKeon were in the thick of it. Unlike the situation at many leading research universities, the undergraduate program at Columbia engaged the continuing attention of many of its leading scholars and its brightest young instructors, who quickly discovered that providing young men with an intelligible introduction to their world could not be achieved within strictly departmental confines. They developed an interdepartmental course, and by making it required of all freshman underlined the conviction: "However intelligent a

boy may be, he is in no position, when he first enters college, to determine a curriculum for himself.”

The effort to introduce the great books into the Columbia undergraduate program had a long and choppy history beginning with John Erskine in 1917. The opposition came chiefly from classical scholars provoked at the notion that any good could come from undergraduates attempting to read and discuss one classic a week. Many scholars also objected that to read a masterpiece in translation was not to read the same work at all. Erskine relished the argument and happily reported:

I agreed. I couldn't help adding that I marveled at my colleagues who did their reading exclusively in the original. I publicly offered them my sympathy for never having read the Old Testament, nor the words of Christ. Of course the Old Testament was possible for any colleague who knew Hebrew, but there was no text extant of the words of Christ in the language he spoke.

When the faculty finally relented, Erskine offered his course in 1920. He later said that the original instructors were a “remarkable lot:” they included both Mortimer Adler and Mark Van Doren.

The Columbia faculty had long been dedicated to the small discussion group for undergraduate instruction. The renowned Nicholas Murray Butler, president of the University for forty-three years, said forthrightly in 1912: “The habit of conveying information to college students by means of lectures is wholly deplorable. It is not only a waste of time, since the printed page would be far better than the spoken word, but it leads to unfortunate and undesirable intellectual habits on the part of the student.” The serious and long-standing efforts of Columbia College to provide a sound liberal education for undergraduates employing the great books and the small discussion group were well known to

Barr and Buchanan, especially through the close, enduring friendship between Buchanan and Van Doren.

Now I have given as much attention as the occasion allows to those activities and events leading up to the arrival of Barr and Buchanan at St. John's in the summer of 1937.

Barr was reluctant to come to St. John's. He knew a bit about the college, and what he knew was not good. He had occasionally come to Annapolis from Charlottesville to lecture at the Naval Academy, and he had found that the reputation of the college next door was poor and that it had just recently lost its accreditation. He did not see it as a promising site for a revival of the great classical tradition. Buchanan, on the other hand, was intrigued. Perhaps his experiences at Virginia and Chicago had shown that only at an institution in dreadful difficulty would they be given a free hand to overturn completely the existing structure and install a revolutionary new order. Barr was persuaded to make the attempt, though he expected to fail; he just felt he had a duty to try. Then it was left to them to sort out their respective responsibilities. Barr relates:

Buchanan said I would have to be president. I scoffed at the idea and reminded him that the curriculum we had dreamed of was his baby, not mine. But he answered he couldn't be president; he didn't answer his mail. I retorted that this was because he believed a lot of it was not worth answering. He agreed but pointed out that his correspondents thought it was, so I would have to be president. I groaned and told him he would have to be dean. He loudly objected but I declined to budge.

I think everyone who knew these two men will agree that it would have been incongruous, and perhaps fatal, if it had turned out the other way. It is just possible to imagine Barr as dean, but Buchanan as president? No way. But Barr as

president and Buchanan as dean seem, in retrospect, almost providentially well-suited to their respective capacities.

Buchanan's function was to create and refine the basic structure; to match tutors to assignments; to build faculty understanding of the Program; to teach, and by teaching, to embody the methods of the seminar leader and of the language and mathematics tutor; to find new faculty members with the capacity to learn how to be tutors, teaching across the program, conquering unfamiliar, treacherous ground. He also had the usual tasks of any college dean: to counsel with students and with tutors; to provide letters of recommendation for graduating students and departing faculty members; to respond to parents' complaints about discipline or lack of discipline. He also took the responsibility to set forth in print, for all skeptics and critics to see, as he did in the catalogues of the college, the reasons why this college had adopted a curriculum radically different from anything else on the academic scene.

Barr confirms that "it was Buchanan who conceived, established, and continuously developed the St. John's program. In a sense he had been building it ever since his work at Cooper Union in the late twenties." Barr continues:

Meanwhile, my job was to interpret it to the public by wide lecturing and by writing; to teach one seminar on the books and usually one language tutorial so I would understand the thing I was publicly interpreting; to find quickly the few men and women who could both grasp what we were doing and finance it in time to keep the College open; to fight off . . . three successive attempts of the Navy Department to get possession of our entire campus; and to reorganize the board of the college.

One interesting sidelight: although typically we see Buchanan as the radical force and Barr exercising some restraint, it was Barr, against Buchanan's advice, who

abolished intercollegiate athletics. Buchanan thought that was one step too many when the alumni were already deeply disaffected, and it would be better to wait another year or two. Barr, however, feeling directly responsible for the health and welfare of the students, was concerned, especially with respect to football, that the Johnnies were outclassed, battling against bigger and better-trained opponents, and that injuries would result for which he would be responsible. He also noted that the scheduling of away-from-home contests required team members to be absent from classes, and the Program was simply too demanding to permit it: student athletes would inevitably fall behind. Instead, he championed a vigorous intramural sports program in which all students could engage on a schedule consistent with their academic obligations.

These two collaborators were very different in temperament and capacities. Quoting Barr again:

. . . three or four years after our New Program started I was delighted with it and Scott was depressed with it. The difference between Scott and me was that when I see a baby I'm enchanted with him and Scott is always feeling, "Well, that's not the baby I had in mind. Babies ought to be better than that." All human enterprises, including birth, seem to him a little disappointing. He's a Platonist in the sense that he's got some notion of a baby in the back of his mind that no baby lives up to, whereas to me it's such a miracle the little brat is alive—so what if he has defects. His ears stick out and he is cross-eyed, certainly, but he's still alive.

At Buchanan's death in 1968, Barr said of their long friendship and collaboration, "Aside from our dialectical bond, he and I were in many ways incompatible; with it, our incompatibilities made our friendship richer."

Since there is so much about Buchanan that helps us to understand the Program, I turn to Winfree Smith, who was a student of his (and of Barr's, as well) at Charlottesville, and who arrived here in the fall of 1941, and who continued to teach here until his death. Although he was an admirer of Buchanan as a teacher, he nevertheless criticized him for being "cavalier in the way he read the great books" and goes on to cite "blunders" he made in his reading of Aristotle and Thomas Aquinas. Smith's examples are convincing. They naturally raise questions about the soundness of Buchanan's "scholarship." Buchanan was not the sort of man you would have asked to write a textbook on the history of philosophy, nor would he have said yes if asked. His interest was not that of a bird overhead, surveying the distant fields below, but of a cannibal on the ground, devouring what he needed, turning flesh to food. I remember that when he was reading the volumes of Arnold Toynbee as they came off the press in the 1940's, almost everything he thought about and talked about related to Toynbee. He made Toynbee his own, so that, in a sense, it was no longer Toynbee. He was engaged, as no other man I have known, in the process that Michel Montaigne called learning.

It is a sign of crudity and indigestion to throw up what we have eaten in the same condition it was swallowed down. The stomach had not performed its office unless it has altered the form and condition of what was given it to cook. . . . Bees pillage the flowers here and there, but they then make honey of them which is all their own; it is no longer thyme and marjoram; so the fragments borrowed from others he will transform and bend together to make a work that shall be absolutely his own; that is to say, his judgment. His education, labor, and study aim only at forming that.

As a teacher, it was never Buchanan's aim to trot out a student who could dutifully and accurately disgorge the opinions and precepts of Plato or Aristotle or Thomas Aquinas or Kant. He hoped, rather, that his students, by means of their fresh encounter with these best minds, would begin to develop, however imperfectly, minds of their own. That would be the beginning of lifelong self-education.

This is not the occasion for an account of the nine-and-one-half years of the Barr-Buchanan leadership nor for a recapitulation of the crises, one after another, that characterized their tenure here, some of which they themselves created, and some of which were thrust upon them. But their departure cannot be understood without some further reference to the attack from the Navy. As everybody here knows, the College is physically separated from the Academy by nothing more than King George Street and a wall, as it was then. The advocates for the Academy argued the necessity of acquiring the College's meager acres to meet further expansion needs. (Although today's enrollment at the Academy is a bit over 4000, it was then projected to rise to 7500.) Perhaps you can imagine the convenience to the Academy of an overpass somewhere along King George Street or a tunnel underneath it connecting the two campuses and fulfilling nicely the Academy's requirements.

The unfolding drama involved President Roosevelt, Eleanor Roosevelt, Secretary of State James Byrnes, Secretary of the Navy Knox and his successor James Forrestal, Admiral Chester Nimitz, Admiral Ernest King, both houses of Congress, and, of course, Admiral Ben Moreell. He was the Navy's Goliath to our David. St. John's defense was led by Barr, Baltimore lawyer Richard Cleveland, and Thomas Parran, Surgeon General of the United States, and fortunately then chairman of the St. John's Board. I am convinced that if World War Two had not ended in 1945, the Navy would have won its war with this college. This was no croquet game; it was life or death for St. John's. But in 1946 the Senate and House committees decided for the College. Except for the

accidents of war and the passage of time, the Navy would have prevailed, and we would not be here. The narrowness of the victory, and the pro-Navy alignment of the local business interests with the local newspaper, led Barr and Buchanan to believe that there would never be an end to these attacks. They were not comforted by the language of the concluding official letter from Secretary Forrestal stating that in view of a resolution adopted by the House Naval Affairs Committee to the effect that “the national emergency neither justifies nor warrants the proposed acquisition of St. John’s campus,” the Navy Department would acquiesce in the Committee’s disapproval, [and] that this “makes it possible for the College to pursue its plans with assurance that it will be secure on its historic site for the foreseeable future.” That concluding phrase, “for the foreseeable future,” provided little comfort to Barr and Buchanan. They could see ahead unending attacks on the College and its vulnerable property. They were wrong, but if one looks objectively at the situation as it was in 1946, it is easy to understand why they thought that the only secure future for the college lay elsewhere.

In a tribute to Barr at the memorial service for him here in 1982, I said:

It is very hard indeed to understand, looking back, how St. John’s College survived those first ten years of the New Program. . . . Just as Stringfellow Barr and Scott Buchanan were turning up the lights on this campus in the late 1930’s, the lights were going out all over Europe. The recently arrived immigrants on the faculty here heard the grim news on their radios as they plotted on their wall maps at home the daily advance of the German armies over Poland and Czechoslovakia and France and the Soviet Union. My freshman class arrived here exactly two months before Pearl Harbor. . . . At the College there were farewell parties virtually every week, as one small group or

students after another entered the Army or the Navy or the Marines or the Air Force. Within two years sixty of the sixty-five members of my class were scattered all over the world. In June 1943 there were fifteen graduating seniors; a year later eight; in 1945, five; in 1946, three.

Yet, for me at least, the memories of the College during those war years are not of hardship and struggle but of exuberance, spirited conversation, and laughter. The tone and style and mood were set [pretty much] by Winkie; without his lively presence, those would have been grim days indeed.

Both of the founders were highly controversial figures. Buchanan was called “a destroyer, an irresponsible amateur, and a corrupter of young men—a man who drew students into worlds of the intellect too difficult for them, who made them, as Buchanan [himself said], ‘misfits in the universe for the time being.’”

In May of 1958, twenty-one years after Barr and Buchanan had sprung the New Program in Annapolis, a group of their former students organized a picnic in their honor. The forty-four of us who gathered for the occasion first heard from their old friend and our friend too, Mark Van Doren. Memorably, he characterized the two men in this fashion:

Both of them are incendiary; both are burning; they have always burned. Scott burns slowly and smokelessly. Winkie burns with a blaze, bright and red and always there, always at the top of his intensity.

When it came Buchanan’s turn to speak, he began by saying: “I want to stage a little tableau for you, a composite oral examination and don rag. I have some questions I want to ask you.” It is questions, not answers, that seem to me to

be the appropriate last words here from Buchanan, even though these questions are admonitory, unlike most of the questions I remember him posing to us in our seminars.

The first question is: Do you believe in and trust your intellect, that innate power that never sleeps? . . . Many of you have gone on to graduate and professional learning, . . . You have fallen into the hands of scholars and into the grooves of practice. . . . In all these learnings and practices have you listened to the small spontaneous voice within that asks continually if these things are true? Do you believe that knowledge is possible, that truth is attainable, and that it is always your business to seek it, although evidence is overwhelmingly against it?

The second question. . . . Have you yet recognized that you are and always have been your own teacher? Liberal education has as its end the free mind, and the free mind must be its own teacher. Intellectual freedom begins when one says with Socrates that he knows nothing, and then goes on to add: I know what it is that I don't know. Do you know what you don't know and therefore what you should know? If your teacher is affirmative and humble, then you are your own teacher.

My third question is. . . more superficial perhaps, but fateful, nevertheless. . . have you persuaded yourself that there are knowledges and truths beyond your grasp, things that you simply cannot learn? Have you allowed adverse evidence to pile up and force you to conclude that you are not mathematical, not linguistic, not poetic, not scientific, not philosophical? If you have allowed

this to happen, you have arbitrarily imposed limits on your intellectual freedom, and you have smothered the fires from which all other freedoms arise.

The fourth question: Do you accept the world? I am thinking of. . . *The Brothers Karamazov*, when Ivan tells Alyosha that he finds it easy to believe in God, but that he finds it impossible to believe in the world. Because he believes in God, he cannot accept the world. For most of us these days, the case is that we have believed in some things so weakly or fanatically that other equally or more real things have become absurd or impossible. This results from our crippled minds. . . . I am persuaded that the cure for this sickness of mind is in some vigorous and rigorous attempt to deal with that most puzzling and mysterious idea, the idea of the world. . . . There have been other such ideas that have governed thought, the idea of God or Being as it puzzled and dazzled the ancient world, the idea of Man as it stirred and fermented the world from the Renaissance on. God and Man have not disappeared as charts and aids to intellectual navigation, but they are in partial eclipse at present, and the world is asking us the big questions, questions in cosmology and science, questions in law and government. They are not merely speculative questions; they are as much matters of life and death and freedom as the old questions were. Most of us have made, with Ivan, a pact with the devil, an agreement not to face them and accept them—yet.

“If these questions are valid,” Buchanan concludes, “they may come somewhere near indicating a standard by which we

judge our common intellectual life, and therefore our common education in this country.”

It will come as no surprise that Buchanan did not think that the curriculum he had designed was definitive, the answer. It was undertaken as a step “in search of a liberal college,” his own descriptive phrase. This idea of “the search” was not a transient notion. On several occasions, he imagined curricula quite different from the one we associate with his name. More than thirty years after the launching of the New Program, he asked a group of the College’s students and tutors the question with which I conclude my remarks: “How is the search going?”

* * *

The chief source of material for this lecture is my recent book, *Radical Visions: Stringfellow Barr, Scott Buchanan, and Their Efforts on behalf of Education and Politics in the Twentieth Century*, Bergin & Garvey, 2001. I have also relied on two earlier works of mine published by the St. John’s College Press: *Stringfellow Barr: A Centennial Appreciation of His Life and Work*, 1997; and *Scott Buchanan: A Centennial Appreciation of His Life and Work*, 1995. The primary sources on which I have depended for all of the above work include the following: J. Winfree Smith, *A Search for The Liberal College: The Beginning of The St. John’s Program*; Harris Wofford Jr., *Embers of the World: Scott Buchanan’s Conversations with Harris Wofford Jr.*; Papers of Stringfellow Barr, Special Collections Department, University of Virginia Library; St. John’s College Papers at the Maryland State Archives; New Program files in the Greenfield Library, St. John’s College; Scott Buchanan Papers, Houghton Library, Harvard University; unpublished transcripts of interviews with Stringfellow Barr; Lionel Trilling and Justus Buchler, *A History of Columbia College on Morningside*; Alexander Meikejohn Papers, Amherst College Library; author’s private papers and correspondence.

Understanding Quantum Mechanics with Bohr and Husserl

François Lurçat

There is no quantum world. There is only an abstract quantum physical description. It is wrong to think that the task of physics is to find out how nature is. Physics concerns what we can say about nature.

Niels Bohr¹

Quantum mechanics brilliantly succeeds as a mathematical formalism: the numbers it provides are always successfully compared with experimental results. But it is often said to fail as an explanatory theory allowing us to understand the laws of atomic processes.² Richard Feynman (1918-1988), author of essential contributions to both the theory and its applications, once declared: “I think I can safely say that nobody understands quantum mechanics.”³ According to Roger Penrose, it “makes absolutely no sense.”⁴ And René Thom described it as “the intellectual scandal of the century.”⁵

There exists, however, an interpretation of quantum mechanics that makes it understandable. It was worked out by Niels Bohr, author of the quantum theory of atoms, in the

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course of more than thirty years of researches and discussions. During the 1930s and 1940s, there was a sort of loose consensus in its favor. But most physicists did not even try to follow the line of Bohr's subtle and deep arguments. Einstein's seminal discoveries had become classic, and he was presently busy with topics outside the mainstream. Bohr, on the contrary, was making essential contributions to nuclear physics. So he was necessarily right about everything, Einstein was a troublemaker, and the debate between both physicists was not really relevant. In the last decades, however, the situation has changed. Some theoreticians have proposed that we replace the "thought experiments" discussed by Einstein and Bohr with feasible ones. Thanks to advances made in measurement techniques and to the ingenuity of many experimentalists, crucial experiments have been done, and their results have supported Bohr's conceptions.⁶ This might perhaps have made these conceptions more acceptable; it turned out, however, that they became less and less accepted. The whiff of heresy no longer lingers about Einstein's thought, but now it surrounds Bohr's. When physicists, philosophers, and historians of science write about such questions, as a rule they refer only vaguely to the Danish physicist's ideas without ever going explicitly and clearly to his texts.⁷

I would like to present here an approach that in my opinion should help to explain why Bohr's essential contribution has been rejected for its strangeness even after its successful confrontation with experiment. I rely on Husserl's definition of phenomenology in his article in the *Encyclopaedia Britannica* (1929). Phenomenology, he writes, "has established (1) an a priori psychological discipline, able to provide the only secure basis on which a strong empirical psychology can be built, and (2) a universal philosophy, which can supply an organum for the methodical revision of all the sciences."⁸ My assumption is as follows: as far as physics is concerned, the kind of methodical revision Husserl had in mind was never undertaken; it is, however, needed

even more urgently now that quantum physics has come to light, in fact, at the same time as phenomenology. The lack of revision, which has permitted the persistence of age-old confusions, can help to explain the paradoxical rejection of the Bohrian approach and the ensuing failure to understand quantum mechanics.

Of course one should not forget that there are many publications devoted to the interpretation of quantum mechanics, some of which are quite valuable. My aim here is not to discuss what has been done recently in this field of research, but to go back to the origins in order to understand why, despite so many efforts, confusion remains about several important aspects of the problem, for instance, about such notions as "observer," "Copenhagen interpretation." In my opinion, as long as Bohr is understood to be an incomprehensible author, the beginnings of quantum mechanics will continue to be shrouded in mist, and the same will probably be true for quantum mechanics as a whole.

Bohr's thought is generally considered difficult to grasp, a difficulty commonly ascribed to what he himself called an "inefficiency of expression."⁹ One may wonder, however, whether the clarity of classical physics, implicitly contrasted with Bohrian obscurity, is not itself at least partly based on an illusion. Because we are familiar with mathematically formalized space and time, we assume a degree of clarity about it. This familiarity has a double origin. It comes from our technical environment, which embodies in some way Euclidean space and Newtonian time (or, when electromagnetic signals are exchanged, Einsteinian space-time). And it follows from a feature analyzed by Husserl: the substitution of the mathematically substructured world of idealities for the real world.¹⁰ The lack of clarity commonly found in Bohr, and the inefficiency of expression for which he blames himself, are actually effects of thought exploring virgin territories. They can be understood as traces of Bohr's effort to free himself from old mental habits. But the feeling of obscurity experienced by Bohr's readers is also due to the

result of that effort: a reasoning free from several—most often implicit—premises of common thought

“We take,” says Husserl, “for *true being* what is actually a *method*.”¹¹ By retaining only those properties of things that can be geometrized, Galileo laid the foundations of modern physics, but at the same time he gave credibility to the prejudice that declared those properties to be the only real ones: nature is mathematical, and whatever cannot be mathematized is relegated to the swamp of preconceptions and subjective impressions.

What made classical physics understandable was the general acceptance of its metaphysical foundations, laid by Galileo and Descartes.¹² During the twentieth century, the development of quantum physics challenged those foundations—a major event in the history of scientific and philosophical thought. But the prevailing positivist view of sciences did not allow that event to be understood or even noticed. According to positivism, there are no metaphysical foundations of sciences; there is a scientific method, the only one that allows us to reach correct conclusions. One can thus understand the negative reception of the Bohrian conception of quantum mechanics. Bohr’s thought has indeed challenged generally accepted ideas, but the status of those ideas is misunderstood. Their metaphysical character is not recognized: they are mistaken for basic and necessary methodological principles.

Classical Physics

Why is quantum theory reputed to contain paradoxes? Because the Galilean and Cartesian substitution of mathematical abstractions for the real world has been almost unanimously and uncritically accepted by scientists and philosophers—except, of course, phenomenologists. The strangeness of quantum physics might even follow from affinities with phenomenology that remain implicit. We must therefore begin this study by taking a brief look at the Husserlian critique of the metaphysical foundations of classical physics.

According to Husserl,¹³ Galileo’s essential discovery is that of “nature, which is in itself mathematical.” Summarizing the Galilean view, he writes again: “Nature is, in its ‘true being-in-itself,’ mathematical.” Hence follows, for Galileo, the “law of exact lawfulness”: every occurrence in nature must come under exact laws. Here we apparently have the basic principles of physical theory, used daily by scientists. Yet the mathematical nature in question is a “methodical idea,” so when we accept Galileo’s discoveries as “straightforward truth,” we repeat his “naïveté,” a naïveté never overcome by his successors. Galileo is a genius: his idea of mathematical nature “blazes the trail for the infinite number of physical discoveries and discoverers.” But he is “at once a discovering and a concealing genius.” With the Galilean mathematization begins “the surreptitious substitution of an idealized nature for prescientifically intuited nature.” In the world where we live, “we find nothing of geometrical idealities, no geometrical space or mathematical time with all their shapes.” This is an important remark, Husserl observes, even though it is so trivial. “Yet this triviality has been buried precisely by exact science, indeed since the days of ancient geometry, through that substitution of a methodically idealized achievement for what is given immediately as actuality.”

Physics, then, appears as “a particular technique, the geometrical and Galilean technique which is called physics.” “In geometrical and natural-scientific mathematization, in the open infinity of possible experiences, we measure the life-world—the world constantly given to us as actual in our concrete world-life—for a well-fitting *garb of ideas*, that of the so-called objectively scientific truths.” This garb of ideas allows us to make predictions relevant to our practical life, and this kind of prediction infinitely surpasses the accomplishment of everyday prediction. But, on the other hand, it dresses up the life-world as “objectively actual and true” nature. It is because of this substitution that the actual meaning of the method was never understood.

Since the days of Galileo, the substitution of a mathematical schematization of nature for the real world has obscured the nature of classical physics; this continuing confusion now hinders us from understanding quantum mechanics. Believing that the trouble started with the advent of quantum physics would be an illusion. Both the obscurity of quantum physics and the clarity of classical physics are grounded in the same initial mistaking of mathematized nature for the world we live in.

For three quarters of a century, the persistent Galilean substitution has been an insuperable obstacle in the way of the acceptance of Bohr's conceptions, which provide a rational and understandable frame for quantum mechanics. The fundamental criticism of substitution by Husserl has not been taken into consideration, and we still pay the price for this neglect or refusal.

Bohr's Dissertation (1911) and Bohr's Atom (1913)

Let us now set some milestones on the way followed by Bohr as he discovered and developed his interpretation of quantum mechanics. This will require placing his work in a historical context, in order to regain with their original strength arguments now covered with various layers of sedimentation.

In 1911, the young physicist defended his dissertation on the electron theory of metals. Its theoretical frame was the statistical mechanics of a gas of electrons. The main result was that magnetic properties of metals cannot be explained in this frame. As Rosenfeld commented in his biographical sketch, "the very rigour of his analysis gave him, at this early stage, the firm conviction of the necessity of a radical departure from classical electrodynamics for the description of atomic phenomena."¹⁴ In 1921, the primary finding of the dissertation was rediscovered by a Dutch physicist, J.H. van Leeuwen; it is currently known as the "Bohr-van Leeuwen theorem."

Two years later, Bohr published his trilogy, *On the Constitution of Atoms and Molecules*. His starting point was Rutherford's hypothesis: an atom is composed of a central nucleus and peripheral electrons. In the first article, devoted to the hydrogen atom, he assumed that the single electron of this atom can follow only a discrete set of trajectories, characterized by a "quantum condition" involving Planck's constant. This means that when the electron is on one of those allowed orbits, it is in a "stationary state" and does not emit electromagnetic radiation. Each of the allowed orbits is characterized by its energy. Radiation takes place only in the transition from one orbit to a second one of smaller energy; the difference between the energies of both orbits is taken away by the quantum of radiation emitted. Such a process is called a transition. From these simple assumptions Bohr deduced the empirical Balmer formula, which describes the main features of the hydrogen spectrum. But, however simple they are, they represent a radical innovation with respect to classical mechanics and electromagnetism.

In classical mechanics, there is a possible trajectory for any initial condition (position and momentum): this precludes any quantization of trajectories or of energies. Bohr understood very early that this freedom of classical trajectories was incompatible with the stability of matter. As he later explained it to Heisenberg:

What I mean by stability is the fact that always the same substances are found, with the same properties; always the same crystals are formed, the same chemical compounds are created, etc. This must mean that, after many modifications due to external influences, an iron atom becomes again an iron atom, with exactly the same properties as it had previously. This cannot be understood according to classical mechanics, above all if one admits that it is like a planetary system. Hence there exists in nature a tendency to produce

definite forms—here I use the word ‘forms’ in its most general sense—and to make these definite forms reappear again and again, even when they have been perturbed and destroyed. . . . This looks incomprehensible if one admits the basic principle of Newtonian physics, namely the strict causal determinism of phenomena; in other terms, if the present state of a system must always be determined uniquely by the state that comes immediately before it, and only by that one. This contradiction worried me very early.¹⁵

According to the trilogy, when a transition takes place the frequency of the radiation emitted depends on the energy of the initial state (before the emission of radiation) and on the energy of the final state (after the emission). If the transition is a process continuously unfolding in time, as are those described by classical physics, how can we understand the idea that the intermediate stage (the emission of radiation) is partly determined by the final stage?¹⁶ To this, Bohr simply answered that while the stationary states of an atom follow the laws of usual mechanics, these laws do not hold for the transition from one state to another.¹⁷ Later he was to develop this idea, specifying that a description of atomic processes in space and time is not always possible. A transition is not a process of which the physicist can write a history, but rather a “quantum jump.” Here we have a radical break with the principles of classical physics, which declared a description in space and time to be a universally valid requirement.

In the relation of physics to experiment we can see another aspect of the break. Newton lays down his axioms of mechanics and draws consequences from them about planetary motions, tides, etc. The refined calculations performed by his successors are almost always borne out by astronomical observations: the only exception, a detail in the motion of Mercury, was explained by Einstein when he laid

down new axioms in his theory of general relativity. Similarly, Maxwell’s equations prevailed until Bohr called into question their universal validity. This represents a new kind of challenge. The aim is no longer to replace one theory with a new one that better meets the Galilean ideal of identity with the physical universe. Rather, Bohr’s atom inaugurated a new conception of the relations between theory and experiment. While classical mechanics and electromagnetism remain essential to describe the stationary states of the atom, some of their implications are rejected: stationary states are quantized and radiationless, despite classical impossibilities. Nature can no longer be identified with the theories of Newton (or Einstein) and Maxwell. They are not wrong, but they have only limited validity.

A Digression on Semiclassical Theories

As we shall see further, Bohr’s atom—“the old quantum theory” as it is now called—is currently considered to have been a provisional theory, superseded by quantum mechanics. This is only a partial truth, however. Bohr’s atom still survives under the rubric of semiclassical theories, an active field of research nowadays.¹⁸ In atomic, molecular, and nuclear physics, for instance, it happens in many cases that the phenomena of interest involve a large number of quantum states: one is thus near the limit where the correspondence principle becomes relevant, as we shall soon see. On the other hand, as Miller puts it, semiclassical theories play an interpretative role: they provide spatiotemporal descriptions, of approximate validity, which nevertheless give tools for understanding that are more efficient than what “exact” quantum mechanical calculations can offer. In the case of the formaldehyde molecule, for instance, or of exchange collisions between a hydrogen atom and a dihydrogen molecule, we are told by specialists that “rigorous” quantum-mechanical calculations are untractable, while semiclassical description permits both an understanding of the phenomena and acceptable numerical results. We must

consider semiclassical theory, then, as the truly relevant theory for such objects or phenomena.

Hence the idea of limited validity has not become obsolete with the advent of quantum mechanics. The epistemological lesson of this idea is as relevant as ever: our concepts are not written in the book of the universe, we ourselves devise them in an effort to understand the laws of natural and, more generally, physical phenomena.

Wave-particle Duality and Its Consequences

There is no question here of summarizing the main stages of the development of quantum theory, or even of Bohr's contributions to it.¹⁹ I would only like to show, relying on Bohrian texts, how phenomenological thought can give a meaning to quantum physics. In order to do that, some historical data will have to be recalled; let us begin with the debate about the quanta of radiation.

A photocell is now a familiar object (found, for instance, in every elevator). One century ago, the photoelectric effect was something new, unexplained by classical electromagnetism. In 1905, Einstein published an article: "On a Heuristic Point of View about the Creation and Conversion of Light."²⁰ He showed that the thermodynamic properties of thermal radiation could be described by comparing the radiation to a gas of light quanta (later called "photons"). Applying this assumption to the photoelectric effect, he obtained a simple relation (the "Einstein equation") between the frequency of incident light and the energy of the electrons freed from the metal. Einstein's "heuristic point of view" so obviously contradicted some known properties of electromagnetic radiation (such as interferences and diffraction) that it was received with scepticism. In 1916, however, the careful experiments of Millikan confirmed the Einstein equation. Another experiment went further in the same direction. When a beam of X-rays falls on a sample of matter, a fraction of the beam is deflected (what is called "scattering") and its wavelength increases. This phenomenon cannot be explained

by classical electromagnetic theory. In 1923, however, Arthur Holly Compton's experiments showed that it could be understood by making use of the hypothesis of light quanta, if they are endowed not only with energy but also with momentum. The scattering of X-rays (now called the Compton effect) is described as a collision between an X-quantum and an electron. From this point on, light quanta seemed to possess all the attributes of particles. The Compton assumption implies a definite relation, well confirmed by experiment, between the increase in wavelength and the angle between scattered and incident radiation.

Thus electromagnetic theory found itself in a strange situation: from interference and diffraction experiments followed the inescapable conclusion that radiation has a wave nature, while other experiments, such as those regarding the photoelectric and Compton effects, convincingly proved its corpuscular nature. While this mysterious duality remained unexplained, it was generally recognized as a fact. There were still opponents to the light quanta, however, and Bohr was one of them. His point of view was well expressed at a conference given in 1922:

In spite of its heuristic value, however, the hypothesis of light-quanta, which is quite irreconcilable with so-called interference phenomena, is not able to throw light on the nature of radiation. I need only recall that these interference phenomena constitute our only means of investigating the properties of radiation and therefore of assigning any closer meaning to the frequency which in Einstein's theory fixes the magnitude of the light-quantum.²¹

What did Bohr have against the hypothesis of light quanta? The relation that gives the energy of a quantum (equal to the frequency multiplied by the Planck constant), whatever its experimental success or "heuristic value" may be, is meaningless. Indeed, the frequency can only be

measured using interference phenomena that are incompatible with the hypothesis of light quanta.

But why should one look for the meaning of a physical concept? For classical concepts, such a problem did not arise: the concepts of classical physics were supposed to be inherent to the physical objects that they described; nature simply was mathematical. Classical physicists might have repeated Galileo's famous assertion that the book of universe is written in geometrical characters. As far as I know, the question about the meaning of a physical concept was first explicitly asked in Einstein's seminal paper about relativity theory.²² He explained there that the usual description of the motion of a material point (based on coordinates as a function of time) "has no physical meaning unless we are quite clear as to what we understand by 'time.'" He then analyzed the experimental procedure allowing us to establish the simultaneity of two events located at two different places; this analysis led him to relativistic kinematics. The important point is that the meaning of simultaneity is disclosed by the experimental procedure that establishes it. The reasoning that goes from experiment to meaning is radically different from that of classical physics, which goes from a priori mathematical principles to the interpretation of experiments. It deviates from the metaphysical foundations of classical physics and gets closer to phenomenology, according to which one should abandon dogmatic certitudes and pay attention to modes of givenness.

When he looks for the meaning of frequency in the experimental method for its measurement, Bohr follows in Einstein's footsteps; but while Einstein came back to the Galilean identification of the universe with geometry, Bohr did not stop moving forward towards phenomenological thought.

Quantum Mechanics

One of the main tools used by Bohr to work out his 1913 theory of atoms was found in the relations between quantum

and classical theories. The stationary states of the hydrogen atom can be numbered according to increasing energies. The number of a state is called its quantum number. Bohr noticed that the numerical results obtained by application of the quantum laws approach the classical results when the quantum number becomes very large. This "correspondence principle" was well borne out afterwards. Between 1919 and 1925, Bohr and his followers worked out the consequences of the correspondence principle. It turned out that, in the simplest cases, important results could be obtained, especially about the interactions between atoms and electromagnetic radiation; but the "systematic guessing guided by the correspondence principle"²³ failed as soon as one dealt with any systems except the simplest ones. For instance the hydrogen atom, with its single electron, lends itself well to these methods, but for the helium atom, which has two electrons, they no longer work. Physicists needed to depart further from classical physics.

The decisive step was taken in 1925 by Heisenberg. In his article "On the Quantum-Theoretical Re-interpretation of Kinematic and Mechanical Relations,"²⁴ he showed how, by transforming the differential equations of classical mechanics into difference equations, one could get a formulation of the expected theory—"quantum mechanics," as it was called by Max Born. While in classical mechanics the physical quantities are represented by numbers, in the new theory they are represented by matrices. Very soon this "matrix mechanics" became a powerful tool, able to deal successfully with problems that had defied the physics of correspondence principle. But a theory that prescribes representing such familiar quantities as the positions and momenta of the electrons by mathematical objects other than numbers is not easy to understand.

Before dealing with this difficulty, some facts should be recalled. With Louis de Broglie's thesis (1924), the wave-particle duality had been extended to electrons. Experiments about the diffraction of electrons by a crystal soon confirmed

that electrons could indeed behave as waves. In 1926, Erwin Schrödinger raised this physical idea to the rank of a coherent theory: wave mechanics. Starting with very different physical conceptions he found again the results of matrix mechanics, especially concerning the stationary states of the hydrogen atom. He hoped that wave mechanics would lead to a theory closer to classical physics. These hopes were to be disappointed by the ensuing developments: the Schrödinger wave is not a classical wave, as shown by the essential fact that the function that describes it is not real-valued but complex-valued. As Max Born showed, the squared modulus of this function can be interpreted as a “probability of presence.”

Debates between Bohr and Heisenberg

Bohr at once recognized quantum mechanics as a father recognizes his child. “The whole apparatus of the quantum mechanics,” he stated in 1925, “can be regarded as a precise formulation of the tendencies embodied in the correspondence principle.”²⁵ Among all the debates of that time, the most relevant for us here is the one between Bohr and Heisenberg. While Heisenberg emphasized mathematical formalism, Bohr wanted to understand physical concepts and to explain them in common language. According to him, whatever the merits of quantum mechanics, the problem of wave-particle duality was not yet solved.

Heisenberg’s discovery of the indeterminacy relation took place after long months of intense discussions with Bohr. In his article,²⁶ he first defined the notion of understanding: “We believe we understand intuitively a physical theory when we can imagine qualitatively its experimental consequences, and when at the same time we have recognized that the application of the theory never implies internal contradictions.” From the mathematical formalism of quantum mechanics, he then deduced the indeterminacy relations: that the product of the imprecisions with which the position of an electron and its momentum are determined is of the order of the Planck constant. (It will appear later that

it is in fact a matter of inequality: the product is greater than or equal to the constant.) He also gave a physical interpretation of the indeterminacy relation, in the case of the state of lowest energy of the hydrogen atom. To determine the position of the electron, one must use a microscope illuminated with a light of wavelength shorter than the size of the electronic orbit (a notion that has no precise meaning in quantum mechanics, but retains some sense as an order of magnitude). Therefore we shall have to use gamma rays. The gamma photon changes the position of the electron (Compton effect), from which comes an imprecision in the determination of the position; the product of the imprecisions about the position and the momentum satisfies the Heisenberg relation.

As will be seen, Bohr criticized this demonstration; but let us first have a look at both protagonists’ conceptions of physical knowledge. They clashed during heated discussions during the winter 1926-27. Unfortunately, “hardly any trace has survived of their conversations in the documents of that time.”²⁷ There is, however, in an interview of Heisenberg in 1963, an analysis that agrees with what is known from other sources:

The main point was that Bohr wanted to take this dualism between waves and corpuscles as the central point of the problem, and to say: “That is the center of the whole story, and we have to start from that side of the story in order to understand it.” I, in some way, would say, “Well, we have a consistent mathematical scheme and this consistent mathematical scheme tells us everything that can be observed. Nothing is in nature that cannot be described by this mathematical scheme.” It was a different way of looking at the problem because Bohr would not like to say that nature imitates a mathematical scheme, that nature does only things which fit into a mathematical scheme. While I

would say, “Well, waves and corpuscles are, certainly, a way in which we talk and we do come to these concepts from classical physics. Classical physics has taught us to talk about particles and waves, but since classical physics is not true there, why should we stick so much to these concepts? Why should we not simply say that we cannot use these concepts with a very high precision, therefore the uncertainty relations, and therefore we have to abandon these concepts to a certain extent. When we get beyond this range of the classical theory, we must realize that our words don't fit. They don't really get a hold in the physical reality and therefore a new mathematical scheme is just as good as anything because the new mathematical scheme then tells what may be there and what may not be there. Nature just in some way follows the scheme.”²⁸

After quoting this interview in his book about Bohr, Abraham Pais adds: “Having talked countless hours with Bohr on complementarity, I could imagine that to Heisenberg's ‘our words don't fit’ he would have replied: ‘Our words *have* to fit, we have nothing else.’”

The difference between both conceptions most clearly appears here. Heisenberg follows the Galilean tradition when he imagines a nature strictly obedient to a mathematical scheme. That can be seen also from his article, when he explains finally:

The proposition that, for instance, the x-component of the velocity is “in reality” not a number but the diagonal term of a matrix, is perhaps no more abstract and no more unvisualizable than the statement that the electric field strengths are “in reality” the time part of an antisymmetric tensor of the spacetime world. The phrase “in reality” here is as much and as little

justified as it is in any mathematical description of natural processes. As soon as one accepts that all quantum-theoretical quantities are “in reality” matrices, the quantitative laws follow without difficulty.²⁹

The ideas of abandoning the classical concepts and giving up common language logically follow from Heisenberg's essential statement that “nature follows a mathematical scheme,” which repeats the Galilean thesis that the universe is written in mathematical language. As will be seen, Bohr maintained and developed the idea that classical concepts and common language remain necessary.

Thus the current idea of a “Copenhagen interpretation” of quantum mechanics, supposedly worked out by Bohr and Heisenberg, should be clarified and even rectified. The discussions between Heisenberg and Bohr were very fruitful for both of them, and they gave rise to two different interpretations of quantum mechanics.³⁰ The Heisenberg interpretation continues the Pythagorean and Galilean traditions; it has been adopted by many theoretical physicists. Bohr's interpretation breaks with these traditions; it has deep similarities to the Husserlian critique of the metaphysical foundations of classical physics.

Complementarity

The close personal collaboration between Bohr and Heisenberg came to an end in the summer of 1927, when Heisenberg left Copenhagen to take up a professorship in Leipzig. In September 1927, an “International Congress of Physicists” took place in Como, on the centenary of Alessandro Volta's death. Bohr gave an address there: “The Quantum Postulate and the Recent Development of Atomic Theory.”³¹ He first characterized the situation of quantum theory with respect to classical physics: on the one hand it entails “a fundamental limitation in the classical physical ideas, when applied to atomic phenomena”; but on the other

hand, “our interpretation of the experimental material rests extensively upon the classical concepts.”

Here a brief comment is in order: we are thus, from the very beginning, at variance with the metaphysical foundations of classical physics. Concepts whose validity is subject to a fundamental limitation cannot be found in nature as one finds a character on a page; rather, the fact that they play an essential role suggests that they are built by physicists to allow an understanding of physical processes. Their privileged role stems, inseparably, both from the features of human knowledge and the nature of physical phenomena.

Bohr then expressed the *quantum postulate*: “to any atomic process [it] attributes an essential discontinuity or rather individuality, completely foreign to classical theories and symbolized by Planck’s quantum of action” (by “individuality” Bohr means indivisibility).³² Indivisibility is indeed completely foreign to the metaphysical foundations of classical physics; in Western science the division of processes or of objects into as many parts as may be necessary is generally considered as a self-evident methodological principle.³³

Bohr then explains:

The postulate implies a renunciation as regards the causal space-time co-ordination of atomic processes. Indeed, our usual description of physical phenomena is based entirely on the idea that the phenomena concerned may be observed without disturbing them appreciably. . . . Now the quantum postulate implies that any observation of atomic phenomena will involve an interaction with the agency of observation not to be neglected. Accordingly, an independent reality in the ordinary physical sense can neither be ascribed to the phenomena nor to the agencies of observation.

As to the indeterminacy relations, Bohr did not deduce them from the interaction with the measuring device, but

from classical considerations. In the theory of optical instruments, indeed, there are well-known relations between the duration of a wave train and the width of its frequency spectrum, and similarly between the spatial extension of the train and the indeterminacy of its wave number. Combining these results with the Planck relation between frequency and photon energy, and the de Broglie relation between wavelength and photon momentum, one gets the Heisenberg relations.

This reasoning is essentially different from Heisenberg’s. According to Bohr, the indeterminacy relations should not be explained by the perturbing action of the photon used for observation, but by the mutual limitation of the possibilities of *definition* of the conjugated physical quantities.³⁴ This point lies at the center of the misunderstandings so often met with, especially in pedagogical or popular accounts of the Heisenberg relations. The central idea is the limited validity of classical concepts, from which follows the limitation of the possibilities of definition. The approximate validity of the concepts of coordinates and momentum components allows us to make picturesque representations of atomic processes. But the very fact that their validity is only approximate requires us to be careful when we ask such questions as “What is the value of the coordinate?” or “What is the value of the momentum component?” Asking such questions carelessly means going no further than Galileo’s mathematical nature, with material points having definite values of their coordinates and momenta. Heisenberg’s proposal takes up again the idea of mathematical nature, simply replacing the old mathematical concepts with new ones. Bohr’s proposal is more fundamental: the meaning of any question has to be clarified by defining the experimental device that allows us to ask it concretely. Such is the meaning of an idea that, from the point of view of the classical tradition, looks strange and even incomprehensible—the reciprocal non-autonomy of atomic processes and experimental devices.

The Debate with Einstein, Podolsky, and Rosen ("EPR")

In the years following the Como congress, a discussion began between Bohr and Einstein. The account of it by Bohr is the most illuminating of his texts.³⁵ I will retain here only some passages of particular relevance for a study of Bohr's way towards phenomenology. In 1935, Einstein, who had become a refugee in the United States, published an article with Boris Podolsky and Nathan Rosen entitled "Can Quantum-Mechanical Description of Physical Reality Be Considered Complete?" (commonly known as EPR). Bohr's answer was published some months later under the same title.³⁶

The first sentence in the abstract of EPR's article at once characterized the philosophical conception of the authors: "In a complete theory there is an element corresponding to each element of reality." This shows how opposite are the premises on both sides: as we have just seen, Bohr's quantum postulate states precisely that atomic processes are indivisible.

Einstein and his collaborators considered the case of two particles A and B that have interacted in the past, between which exists such a correlation that the measurement of a quantity (coordinate or momentum) belonging to A immediately gives the value of this quantity for B. (That such correlations exist is a consequence of quantum mechanics.) EPR states: "If, without in any way disturbing a system, we can predict with certainty. . . the value of a physical quantity, then there exists an element of physical reality corresponding to this physical quantity." Now, EPR continues, we can choose to measure of A either its coordinate or its momentum. Because of the correlation between A and B, these measurements will give the value of the coordinate or of the momentum of B. As we did not touch B, we must conclude that B has indeed determined values of the coordinate and the momentum. Since according to quantum mechanics this cannot be, it follows that the quantum-mechanical description is incomplete.

In his answer, Bohr first outlined the general frame of the debate. The apparent contradiction raised by EPR, he says,

"in fact discloses only an essential inadequacy of the customary viewpoint of natural philosophy for a rational account of physical phenomena of the type with which we are concerned in quantum mechanics. Indeed the *finite interaction between object and measuring agencies* conditioned by the very existence of the quantum of action entails. . . the necessity of a final renunciation of the classical ideal of causality and a radical revision of our attitude towards the problem of physical reality."

Bohr then shows that the correlations, presented by EPR in the abstract form of a mathematical expression for the wave function of the two particles, can be realized by sending the particles across suitably arranged diaphragms. He comes at last to the core of the argumentation. The criterion of physical reality proposed by EPR, he says, "contains an ambiguity as regards the meaning of the expression 'without in any way disturbing a system.'" Of course there is no mechanical disturbance of the system B. But there is "*an influence on the very conditions which define the possible types of predictions regarding the future behavior of the system*" (Italics are Bohr's). And he concludes: "Since these conditions constitute an inherent element of the description of any phenomenon to which the term 'physical reality' can be properly attached, we see that the argumentation of the mentioned authors does not justify their conclusion that quantum-mechanical description is essentially incomplete." He then points out that the experimental procedures permitting the definition of complementary quantities (such as coordinate and momentum) are mutually exclusive; this "provides room for new physical laws, the coexistence of which might at first sight appear irreconcilable with the basic principles of science." The final conclusion then follows: "It is just this entirely new situation as regards the description of physical phenomena, that the notion of *complementarity* aims at characterizing."

We have here a further elaboration of ideas already presented at the Como conference. But the critical passage of

Bohr's answer, quoted above, enjoys a special reputation because John Bell had explained why he did not understand it³⁷ (One should not forget how fruitful Bell's lack of understanding of Bohr's conceptions was: it gave rise to Bell's fundamental discovery, perhaps the most important one in theoretical physics in the second half of the twentieth century). It may be useful, therefore, to comment briefly on the italicized passage. In the first sentence, by "the very conditions that define the possible types of predictions regarding the future behavior of the system" Bohr means the whole experimental arrangement. The sentence then means: choosing to measure either the coordinate or the momentum of A has practical implications, because, in accordance with this choice, we must modify the experimental device. The second sentence then could be stated: in the quantum domain, a relevant description of a real phenomenon is one that includes the whole experimental arrangement.

The core of the contradiction between Bohr's conception and what he calls "the customary viewpoint of natural philosophy" may appear even better in less formal accounts. The physicist Robert H. Romer tells us how, as a graduate student, he had the opportunity to spend an hour with Einstein.³⁸ "Do you really believe," Einstein asked him, "that if you would measure the z component of the spin of an atom here, that might instantaneously have an effect on the spin of another atom, perhaps miles away from here?" The question here is about the correlation between two atomic objects, already considered in EPR's article, but in a different form, one nearer to practically realizable experiments. Probably inspired by David Bohm's treatise on quantum mechanics,³⁹ what Einstein had in view was not the coordinates and momenta of two particles, but the spins of two atoms. To be even nearer to experiments that have been really carried through, we shall now speak about the correlated polarizations of two photons, emitted by a calcium atom. The result of the measurement of polarization of photon A is random, and the same is true for photon B. But as the two photons

have been emitted by the same atom, when we know the result of measurement A we can predict with certainty the result of measurement B, and conversely. What Einstein refers to, then, is the following paradoxical question: if the two photons are far apart, how can the result of one of the measurements have an influence on that of the other one?

The correlation of both experimental results has been well proved now; for instance, in Gisin's experiments both measurement devices are more than 6 miles apart.⁴⁰ Einstein had always considered such correlations (which during his lifetime were never experimentally proved) as unacceptable; this opinion justified his opposition to quantum mechanics. In 1947, speaking to his friend Max Born about the statistical interpretation of quantum mechanics (and hence about quantum mechanics itself), he wrote: "I cannot, consequently, believe it really, for the theory is incompatible with the principle according to which physics must represent a space and time reality, without spooky action at a distance."⁴¹

Let Bohr and Husserl answer Einstein in an imaginary dialogue:

"I had," says Bohr, "answered in advance in general terms in my Como report. What the quantum postulate says is precisely that quantum phenomena have a character of indivisibility completely foreign to classical physics. Of course one may be surprised at a feature so remote from our every day experience, but there is nothing unacceptable here."

Husserl adds for his part: "When you speak about atoms (or photons), you have in view small objects belonging to 'nature, which is in itself mathematical.' You do not take into account the way by which these supposed objects come to our knowledge. It seems that now, experiment is for you no longer anything else but a way of checking the theories. If the raw experimental facts (the

click of a counter, or a trace in a Wilson chamber) were mere signs for elements of the mathematical nature, one could disregard the signs and care only about the signified. But as I have explained long ago, it is misleading to think that in physics we are dealing with 'true' physical things, while the appearances are only signs of these true things. As I said, 'the perceived physical thing itself is always and necessarily *precisely the thing which the physicist explores and scientifically determines following the method of physics.*'⁴² Now there is nothing in the experimental results that would allow us to state that the part of the experimental arrangement located in A, for instance, deals with a definite partial object, named the photon A; we can only say that the complete experimental arrangement deals with the radiation (two photons per atom) emitted by calcium atoms. We must abide by what is or can be actually perceived."

"This is," Bohr adds finally, "precisely what you did at the time of your seminal article about special relativity, when you discarded Newton's absolute space (at that time an essential part of the supposed mathematical nature) because it has no counterpart in the experimental methods of measuring distances and durations."

To follow Bohr's and Husserl's wise advice, we should mention measurements carried out on the "biphotons" emitted by calcium atoms. The correlation between the results recorded by both parts of the experimental arrangement (photomultipliers and polarizers on both sides) shows that as far as the polarizations are concerned, the biphoton is not separable into two photons. This result is surprising, but it is the case. One of the great merits of EPR's article is that it raised the problem of distant correlations, a striking proof of the originality of quantum phenomena.

Bohr's Report about His Discussions with Einstein: Complementarity

This report was published in 1949, in a volume of the collection "The Library of Living Philosophers" devoted to Einstein.⁴³ Going back over the successive stages of the debate, Bohr improved or corrected several of his formulations, nearing a phenomenological approach. First he reviewed the role of classical concepts, which he considered essential for the description of experiments and their results to be communicable to other people. Bohr then critically examined the interpretation of the indeterminacy relation. "A sentence like 'we cannot know both the momentum and the position of an atomic object,'" he explained:

raises at once questions as to the physical reality of two such attributes of the object, which can be answered only by referring to the conditions for the unambiguous use of space-time concepts, on the one hand, and dynamical conservation laws, on the other hand. While the combination of these concepts into a single picture of a causal chain of events is the essence of classical mechanics, room for regularities beyond the grasp of such a description is just afforded by the circumstance that the study of complementary phenomena demands mutually exclusive experimental arrangements.

Let us comment on this passage. Energy and momentum, subjected to conservation laws, allow a causal description of atomic processes. In the Compton effect, for instance, the collision between a photon and an electron—which in the initial state are supposed to have definite values of energy and momentum—is the cause of a final state in which both particles take different directions ("scattering"). This description allows us to discover a relation, well confirmed by experiment, between the deflection of the X-radiation and

the increase of its wavelength. But on the other hand a space-time description of the X-beam is necessary for the definition and measurement of its wavelength; such a description corresponds to experimental situations where diffraction phenomena, described in terms of waves, can take place. Bohr's comment, then, is that these two descriptions require mutually exclusive experimental arrangements. This allows a rigorous critique of the quoted sentence ("We cannot know both"), which implicitly assumes that the particles really have at any time, as in classical mechanics, determined values of coordinates and momenta. According to the Galilean conception of nature as in itself mathematical, one may speak about "the position (or the momentum) of the particle," without wondering whether these words have a precise meaning. Bohr requires us to become aware that a particle has such an attribute (coordinate or momentum) only as a part of a relevant experimental arrangement. As the arrangements relative to coordinate and momentum are mutually exclusive, the criticized sentence has no rigorous meaning.

This example shows how complementarity requires us to get rid of the "nature mathematical in itself" and relate any statement about atomic objects to the experimental situation in which it can be tested.

Bohr's Report about His Discussions with Einstein: The Observer and Objectivity

The report then described Einstein's objections to some quantum statements. In his answers, Bohr always implemented the above stated complementarity principle. He also dealt with the random aspect of atomic processes (This is an aspect which can be easily observed if one uses a radioactive source of weak intensity and a counter: the only reasonable description of the time sequence of the clicks of the counter is as a random sequence). According to Dirac, individual effects of that kind correspond to a choice on the part of nature. According to Heisenberg, on the other hand, in such cases "we have to do with a choice on the part of the

'observer' constructing the measuring instruments and reading their recording." As he quickly refuted both points of view, Bohr put forward an interesting argument about Heisenberg: "It is certainly not possible for the observer to influence the events which may appear under the conditions he has arranged."

This sentence briefly settles both sides of the question of the "observer." *The observer does not create or influence the phenomenon, but he creates the conditions of the phenomenon.* On the one hand, the laws of atomic processes are objective, independent of our desires and of fashions (at least in their essential content); but on the other hand, the properties of individual atomic objects can only appear when we, physicists, prepare an experimental arrangement and record the results. (Or else, when we prepare the arrangement for the automatic recording of the results.) This statement is not a dispensable comment: it is inscribed in the very mathematical formalism of quantum mechanics. The basic element of the formalism is indeed an amplitude, made of two abstract vectors; one of them represents the preparation of an experiment, while the second one represents one of its possible results.⁴⁴ Without physicists, there is neither preparation nor results. Of course the experimental results are objective: if the experiments are correctly and honestly carried out, their results will be (approximately) the same in different laboratories and different countries. One can hardly say, however, that they are independent of human beings, because without human beings there would be no results.

In that respect, atoms differ from physical objects of human or astronomical dimensions. One might try to summarize this essential difference by saying that *atoms are invisible*. This formulation, however, is too cursory. Microbes and remote galaxies seem invisible as well, but they are able to be seen. To see them, one magnifies their image with a microscope or a telescope; as Galileo replied to those who questioned the objectivity of the images given by his telescope, perhaps lynxes, with their sight better than ours,

can see the satellites of Jupiter he had discovered. But atomic objects make their entrance in the sensible world of appearances thanks to a much more complex and roundabout process: in a counter or in a Wilson-type chamber, they come into contact with a macroscopic system in an unstable state, in which they trigger an avalanche-type process. For the believer of "nature mathematical in itself," such a difference does not deserve any attention: atoms, like stones and stars, are "in space." But it is an essential difference from the point of view of common sense, as well as for the phenomenologist, whose field of study can be defined as "the method of the analysis of essences within the sphere of immediate evidence."⁴⁵ Furthermore, the phenomenologist has something to add here, because for him the essential difference between the modes of givenness of atoms on the one hand, and of stones and stars on the other hand, points out that they belong to different regions of reality.⁴⁶

The misunderstandings between Bohr and most physicists stem from his claim of an essential difference between quantum phenomena and the world of classical physics. The drama of physics, and more particularly of quantum physics, is that it never admitted the notion of regions of reality or, equivalently, the notion of essential differences. When Galileo annexed sensible appearances to the world of mathematical concepts, he put an obstacle in the way of understanding what physics really is, an obstacle still not overcome.

In his study "Einstein and the Quantum Theory," Abraham Pais recalls his conversations with Einstein.⁴⁷ There we find one of the most striking examples of a refusal of essential differences. I quote Pais:

We often discussed his notions on objective reality. I recall that during one walk Einstein suddenly stopped, turned to me and asked whether I really believed that the moon exists only when I look at it.

There is no question that the moon existed before human beings were there to look at it; all the same, quantum mechanics describes phenomena as prepared and observed by human beings. Abiding by "nature mathematical in itself" leads to insuperable problems. It would probably be wiser to take into account the notion of regions of reality, admitting that the moon, on the one hand, and atomic objects, on the other hand, which are given to us in such radically different ways, belong to different regions.

This being said, one should never forget that without Einstein and some of his followers (David Bohm, John Bell), who resolutely and perseveringly opposed Bohr's views, we would have perhaps gotten no further than the Bohrian vulgate of the 1930s and 1940s, according to which there was essentially no problem. Today mimetism and unanimity are harmful to science.

Bohr's Report about His Discussions with Einstein: The Phenomenon

Finally the report recalled a review of some terminological questions, made by Bohr in his contribution to the conference, "New Theories in Physics" (Warsaw, 1938):

In this connection I warned especially against phrases, often found in the physical literature, such as "disturbing of phenomena by observation" or "creating physical attributes to atomic objects by measurements." Such phrases, which may serve to remind one of the apparent paradoxes in quantum theory, are at the same time apt to cause confusion, since words like "phenomena" and "observations," just as "attributes" and "measurements," are used in a way hardly compatible with common language and practical definition.

Both phrases are in fact quotations from Heisenberg. We have already discussed the first one, and the second one can

be found in his article on the uncertainty relations: "The 'trajectory' first comes into being by the fact that we observe it" (*"Die 'Bahn' entsteht erst dadurch, dass wir sie beobachten"*).⁴⁸ Bohr then explained how one should understand the words "phenomenon" and "observation:"

As a more appropriate way of expression I advocated the application of the word *phenomenon* exclusively to refer to the observations obtained under specified circumstances, including an account of the whole experimental arrangement. In such terminology, the observational problem is free of any special intricacy since, in actual experiments, all observations are expressed by unambiguous statements referring, for instance, to the registration of the point at which an electron arrives at a photographic plate. Moreover, speaking in such a way is just suited to emphasize that the appropriate physical interpretation of the symbolic quantum-mechanical formalism amounts only to predictions, of determinate or statistical character, pertaining to individual phenomena appearing under conditions defined by classical physical concepts.

Here, Bohr defines his rules: break with "nature mathematical in itself" and use "practical definitions," dealing with experiments and their results. Describe them in the language of classical physics, appropriate to the visible world. Keep to the definition of the phenomenon: it occurs in conditions determined by the physicist; it consists of macroscopic events; it is within the reach of senses, hence it can be described in "common language."

Finally, in the use of the notion of attribute, Bohr sees the danger of forgetting that position, momentum, and other quantities relating to an atomic object can only be defined in terms of a method of measurement, which implicitly supposes

an indissoluble bond between object and measuring apparatus. Of course, it is not always easy to follow these rules, for an age-old tradition constantly incites us to ask: Where is the atom? Which path did the photon follow? But we know that we should answer these questions with practical definitions: if you want to know which path the photon has followed, build and use an apparatus designed to give an answer.

Conclusion

In his Vienna lecture of 1935, Husserl summarized the situation of modern physical sciences:

Mathematical natural science is a wonderful technique for making inductions with an efficiency, a degree of probability, a precision, and a computability that were simply unimaginable in earlier times. As an accomplishment it is a triumph of the human spirit. As for the rationality of its methods and theories, however, it is a thoroughly relative one. It even presupposes a fundamental approach that is itself totally lacking in rationality. Since the intuitively given surrounding world, this merely subjective realm, is forgotten in scientific investigation, the working subject is himself forgotten; the scientist does not become a subject of investigation (Accordingly, from this standpoint, the rationality of the exact sciences is of a piece with the rationality of the Egyptian pyramids).⁴⁹

In classical physics, the oversight of the subject manifests itself in the form of belief in mathematical nature. Galileo began with the sensible world of appearances; he then amputated from it most of its qualities, and, finally, denied the reality of the suppressed qualities. (There is no essential difference between the Galilean illusion and the present-day naturalistic illusion, according to which the essence of objec-

tivity lies in the electrochemical processes that take place in the brain.)⁵⁰

With quantum physics, the negation of the subject began to exert its corrosive action within the physics itself. The classical physicist did not understand the nature of his science; the quantum physicist does not understand his very science, and, as we have seen, he is in many cases aware of this lack of understanding. Locked up in the Galilean prison, he does not see the key proposed by phenomenology, a key that Bohr, to a certain extent, rediscovered by himself.

For a long time, atoms could be reached only by speculation, first philosophical, then scientific. It became possible to perform experiments on atoms only when scientific instruments designed to comply with theoretical notions about their nature could be made. To make counters and chambers of various types, one must have the electromagnetism of Maxwell-Faraday, notions about electrical discharge in gases or about thermodynamics, and basic notions of atomic theory. Atoms, molecules, nuclei, particles, which are not parts of the sensible world of appearances, can have perceptible effects and become accessible to experiment, but only in a society with a high degree of scientific and technical development. They are given to us in quite a different way than are stones, trees or stars.

But the essential importance of this difference can be seen only by getting out of the metaphysical matrix inside which the growth of classical physics took place. As long as physics is understood as dealing with “nature mathematical by itself,” perceptibility, or lack thereof, will continue to be reputed unessential. In the prevailing way of understanding quantum phenomena, quantum mechanics is a universal theory, while classical physics is merely an approximation valid for processes involving actions large with respect to the Planck constant. The subjective side of the difference thus falls out of sight, and both the way to Bohrian conceptions and the way to phenomenology are barred.

Quantum mechanics is really, as René Thom once put it, an “intellectual scandal”: a theory successfully used in many different fields of science and technology, which most people accept without understanding it. Husserlian phenomenology proposes a frame in which this paradoxical lack of understanding might be understood, thereby opening a way towards recovery. It invites us to enlarge our horizons, especially by going back over the origins of physics (of modern physics, but not only of it). It suggests that our irrational attitude towards quantum mechanics is part of a wider historical fact: the global lack of understanding of the nature of science, which became an acute problem with the advent of modern science. In the present situation of the world, this problem has become particularly urgent.⁵¹

I would like to thank Pamela Kraus for her kind linguistic and editorial help.

¹ Declarations of Bohr reported by A. Petersen, *The Philosophy of Niels Bohr*, Bulletin of the Atomic Scientists, Vol. 19, pp. 8-14 (1963). See also M. Jammer, *The Philosophy of Quantum Mechanics*, New York, John Wiley & Sons, 1974, p. 204.

² I use the convenient term “atomic” to refer to such physical entities as atoms, molecules, nuclei, and particles.

³ R.P. Feynman, *The Character of Physical Law*, Cambridge, Mass., MIT Press, 1965, p. 129.

⁴ R. Penrose, in: R. Penrose, C.J. Isham (eds.), *Quantum Concepts in Space and Time*, Oxford, Clarendon Press, 1986, p. 139.

⁵ R. Thom, *Prédire n'est pas Expliquer*, Paris, Flammarion, 1993, p. 86.

⁶ Conclusive experiments about the violation of Bell's inequalities have been made by Alain Aspect and his collaborators in Orsay: A. Aspect, P. Grangier, G. Roger, *Physical Review Letters*, Vol. 47, p. 460 (1981); Vol. 49, p. 1804 (1982). More recently, I have been interested in the experiments of Nicolas Gisin and his group in Geneva: W. Tittel, J. Brendel, H. Zbinden, N. Gisin, *Physical Review Letters*, Vol. 81, p. 3563 (1998); A. Stefanov, H. Zbinden, N. Gisin, A. Suarez, *Physical Review Letters*, Vol. 88, p. 120404 (2002). Additionally, I have considered those of Anton

Zeilinger and his group in Vienna: G. Weihs, T. Jennevein, C. Simon, H. Weinfurter, A. Zeilinger, *Physical Review Letters*, Vol. 81, p. 5039 (1998).

⁷ Such is the case, for instance, of the philosopher David Z. Albert's book *Quantum Mechanics and Experience*, Cambridge, Mass. and London, Harvard University Press, 1992; of the historian of science Mara Beller's book *Quantum Dialogue*, Chicago and London, The University of Chicago Press, 1999; of the physicist Frank Lalœ's article "Do We Really Understand Quantum Mechanics? Strange Correlations, Paradoxes, and Theorems," *American Journal of Physics*, Vol. 69, pp. 655-701 (2001); and of the physicist Bernard d'Espagnat's book *Traité de Physique et de Philosophie*, Paris, Fayard, 2002.

⁸ E. Husserl, article *Phenomenology*, *Encyclopaedia Britannica*, Vol. 17 (1947) (first publication: 1929). See also E. Husserl, *Collected Works*, Vol. 8, Kluwer Academic Publishers, Dordrecht/Boston/London, 1999.

⁹ Commenting on his answer to Einstein, Podolsky, and Rosen, Bohr writes: "Rereading these passages, I am deeply aware of the inefficiency of expression which must have made it very difficult to appreciate the trend of the argumentation." N. Bohr, "Discussions with Einstein on Epistemological Problems in Atomic Physics," in: P.A. Schilpp (ed.), *Albert Einstein, Philosopher-Scientist*, New York, Tudor Publishing Company, 1949. This text is reprinted in: N. Bohr, *Atomic Physics and Human Knowledge*, New York, John Wiley & Sons, 1958. Also in: J. Kalckar (ed.), *Niels Bohr Collected Works*, Vol. 7, Amsterdam, Elsevier, 1996, p. 234. (In the following the *Collected Works* is abbreviated as BCW.)

¹⁰ E. Husserl, *Die Krisis der Europäischen Wissenschaften und die Transzendente Phänomenologie*, §9h. Translation by David Carr: *The Crisis of European Sciences and Transcendental Phenomenology*, Evanston, Northwestern University Press, 1970.

¹¹ E. Husserl, *The Crisis* §9h. Translation quoted, p. 51. All the analysis in the following section is a simplified summary of this paragraph of the *Crisis*.

¹² See E.A. Burtt, *The Metaphysical Foundations of Modern Physical Science* (1924; revised edition, 1932), Doubleday Anchor Books, Doubleday & Company, Garden City, N.Y., 1954.

¹³ E. Husserl, *The Crisis*, loc. cit.

¹⁴ L. Rosenfeld, *Niels Bohr, Biographical Sketch*, in: J. Rud Nielsen (ed.), *Niels Bohr Collected Works*, Vol. 1, Amsterdam, North-Holland Physics Publishing, 1972, p. XIX.

¹⁵ From W. Heisenberg, *Der Teil und das Ganze*, Munich, R. Piper & Co Verlag, 1969, chapter 3. English translation: *Physics and Beyond*, New

York, Harper and Row Publ., 1971. I translate from the French translation by Paul Kessler, *La Partie et le Tout*, Paris Albin Michel, 1972.

¹⁶ The remark about the frequency determined not only by the initial state of the atom, but also by its final state can be found in Bohr's Nobel Conference (1922): *The Structure of the Atom*, in BCW, Vol. 4, 1977, pp. 467-482.

¹⁷ N. Bohr, *On the Constitution of Atoms and Molecules*, Part I, § 1; in BCW, Vol. 2, 1981, p. 167.

¹⁸ W.H. Miller, "Semiclassical Methods in Chemical Physics," *Science*, Vol. 233, pp. 171-177 (1986). T. Uzer, D. Farrelly, J.A. Milligan, P.E. Raines, J.P. Skelton, "Celestial Mechanics on a Microscopic Scale," *Science*, Vol. 253, pp. 42-48 (1991).

¹⁹ The interested reader may refer to: M. Jammer, *The Conceptual Development of Quantum Mechanics*, New York, Mc Graw Hill, 1966; B.L. van der Waerden, *Sources of Quantum Mechanics*, Amsterdam, North-Holland, 1967; or to A. Pais, *Niels Bohr's Times, in Physics, Philosophy, and Polity*, Oxford, Clarendon Press, 1991.

²⁰ A translation of this article is given in: D. ter Haar, *The Old Quantum Theory*, Oxford, Pergamon Press, 1967.

²¹ N. Bohr, *The Structure of the Atom*, above quoted conference; see p. 470.

²² A. Einstein, *Zur Elektrodynamik bewegter Körper*, *Annalen der Physik*, 4th series, Vol. XVII, pp. 891-921 (1905). A translation of this article is given in: H. A. Lorentz, A. Einstein, H. Minkowski, H. Weyl, *The Principle of Relativity*, New York, Dover Publications, 1952.

²³ This phrase belongs to van der Waerden, see reference 19.

²⁴ W. Heisenberg, "Über Quantentheoretische Umdeutung Kinematischer und Mechanischer Beziehungen," *Zeitschrift für Physik*, Vol. 33, pp. 879-893 (1925). A translation of this article is given in van der Waerden, reference 19.

²⁵ N. Bohr, "Atomic Theory and Mechanics," Supplement to *Nature*, December 5, 1925, pp. 845-852. In BCW, Vol. 5, pp. 273-280.

²⁶ W. Heisenberg, "Über des Anschaulichen Inhalt der Quantentheoretischen Kinematik und Mechanik," *Zeitschrift für Physik*, Vol. 43, pp. 172-198 (1927). The original text is given in BCW, Vol. 6. There is a translation in: J.A. Wheeler, W.H. Zurek, *Quantum Theory and Measurement*, Princeton University Press, 1983.

²⁷ I have used the book by Jagdish Mehra and Helmut Rechenberg *The Historical Development of Quantum Theory*, Vol. 1 to 6, New York,

Springer-Verlag, 1982-2001. See Vol. 6, “*The Completion of Quantum Mechanics, 1926-1941*,” chapter 2. The quotation is from page 151.

²⁸ Interview of Heisenberg quoted by A. Pais, *Niels Bohr's Times*. . . quoted above, pp. 309-310.

²⁹ W. Heisenberg, “Über den Anschaulichen Inhalt,” article quoted above, end of § 4; translation quoted, p. 82.

³⁰ See the books, already quoted, of J. Mehra and H. Reichenberg, and of A. Pais, and above all the introduction and comments of J. Kalckar to Vol. 6 of BCW.

³¹ N. Bohr, “The Quantum Postulate and the Recent Development of Atomic Theory,” *Nature*, Vol. 121, pp. 580-590 (1928). Reprinted in: *The Philosophical Writings of Niels Bohr*, Vol. 1, *Atomic Theory and the Description of Nature*, Ox Bow Press, Woodbridge, Connecticut, 1987. Also in: J.A. Wheeler, W.H. Zurek, *Quantum Theory and Measurement*, book quoted above; and Vol. 6 of BCW.

³² “The inability of the classical frame of concepts to comprise the peculiar feature of indivisibility, or ‘individuality,’ characterizing the elementary processes.” N. Bohr, *Discussions with Einstein*. The passage quoted is at page 34 of: N. Bohr, *Atomic Physics and Human Knowledge*. op. cit.

³³ Descartes, for instance, states this principle explicitly in the *Regulae ad Directionem Ingenii* (Rule 13), and in the *Discours de la Méthode*, Second part.

³⁴ “Indeed, a discontinuous change of energy and momentum during observation could not prevent us from ascribing accurate values to the space-time coordinates, as well as to the momentum-energy components before and after the process. The reciprocal uncertainty which always affects the values of these quantities is (. . .) essentially an outcome of the limited accuracy with which changes in energy and momentum can be defined, when the wave-fields used for the determination of the space-time coordinates of the particle are sufficiently small.” (N. Bohr, “The Quantum Postulate,” § 3)

³⁵ N. Bohr, *Discussions with Einstein*. I have analyzed other aspects of the Bohr-Einstein debate in my book *Niels Bohr et la Physique Quantique*, coll. “Points Sciences,” Paris, Editions du Seuil, 2001.

³⁶ A. Einstein, B. Podolsky, N. Rosen, *Physical Review*, Vol. 47, pp. 777-780 (1935). N. Bohr, *Physical Review*, Vol. 48, pp. 696-702 (1935). Both texts are reprinted in: J.A. Wheeler, W.H. Zurek, *Quantum Theory and Measurement*, quoted above. Also in BCW, Vol. 7.

³⁷ J. Bell, “Bertlmann’s Socks and the Nature of Reality,” *Journal de Physique*, Vol. 42, Coll. C2, suppl. n°3, pp. 41-61 (1981). Reprinted in: J. Bell, *Speakable and Unspeakable in Quantum Mechanics*, Cambridge University Press, 1987.

³⁸ R.H. Romer, Editorial: *John S. Bell (1928-1990)*, “The Man Who Proved Einstein was Right,” *American Journal of Physics*, Vol. 59, p. 299 (1991).

³⁹ D. Bohm, *Quantum Theory*, Englewood Cliffs, N.J., Prentice Hall, 1951.

⁴⁰ See the articles of the Gisin group quoted above, reference 6.

⁴¹ A. Einstein, letter to Max Born, March 3, 1947, in: M. Born (ed.), *The Born-Einstein Letters*, London, Macmillan, 1971. French translation by Pierre Leccia: Albert Einstein, Max Born, Hedwig Born, *Correspondance 1916-1955, Commentée par Max Born*, Paris, Editions du Seuil, 1972.

⁴² E. Husserl, *Ideen zu Einer Reinen Phänomenologie und Phänomenologischen Philosophie. I. Buch: Allgemeine Einführung in die Reine Phänomenologie* (1913), p. 99. Translation by F. Kersten: *Ideas pertaining to a Pure Phenomenology and to a Phenomenological Philosophy, First Book: General Introduction to a Pure Phenomenology*. Edmund Husserl, *Collected Works*, Vol. 2, The Hague, Martinus Nijhoff Publishers, 1982.

⁴³ N. Bohr, *Discussions with Einstein*, see note 9.

⁴⁴ This is explained in textbooks, for instance by Feynman: R.P. Feynman, R.B. Leighton, M. Sands, *The Feynman Lectures on Physics*, Vol. 3, Reading, Mass., Addison-Wesley, 1965.

⁴⁵ E. Husserl, *Die Idee der Phänomenologie* (1907), p. 14. Translation by Lee Hardy: *The Idea of Phenomenology*, Kluwer Academic Publishers, Dordrecht/ Boston/ London, p. 70.

⁴⁶ E. Husserl, *Ideen zu Einer Reinen Phänomenologie und Phänomenologischen Philosophie. Drittes Buch: Die Phänomenologie und die Fundamente der Wissenschaften*, ed. by Marly Biemel, *Husserliana 5*, The Hague, Martinus Nijhoff, 1971. Translation by Ted E. Klein and William E. Pohl: *Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy, Third Book: Phenomenology and the Foundations of the Sciences*. Edmund Husserl, *Collected Works*, Vol. 1, The Hague, Martinus Nijhoff Publishers, 1980.

⁴⁷ A. Pais, *Reviews of Modern Physics*, Vol. 51, p. 863 (1979). The quoted passage is at page 907.

⁴⁸ W. Heisenberg, article quoted above (note 26), §3, page 185 of the original text.

⁴⁹ E. Husserl, *Die Krisis des Europäischen Menschentums und die Philosophie*, published as an Appendix of *Die Krisis der Europäischen Wissenschaften*. Translation by David Carr in *The Crisis. Philosophy and the Crisis of European Humanity*, a lecture presented before the Vienna Cultural Society on May 7 and May 10, 1935.

⁵⁰ This prejudice had been already aptly criticized by Erwin Straus, *Vom Sinn der Sinne, Ein Beitrag zur Grundlegung der Psychologie*, 1st edition, 1935; 2nd edition, Berlin, Heidelberg, New York, Tokyo, Springer-Verlag, 1956.

⁵¹ Such is the problem that I study in my book *De la Science à l'ignorance*, Paris, Editions du Rocher, 2003.



Eve Separate

Eva Brann

In memory of John P. McNulty (1952-2005), an acute and sensitive reader of great books and a lovely partner in our seminar conversations, particularly about Paradise Lost.

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For stirring up thought in general and for particular insights I warmly thank the members of a seminar on *Paradise Lost* held at St. John's College on October 30-31, 2005: Patricia Cook and George Lucas, Margaret and Steve Crockett, Cecie and Paul Dry, Murray Dry, Emily and Sam Kutler, Gretchen and Barry Mazur, Joyce Olin and Chris Nelson.

At lunch with Max Kronberg, then one of our juniors (who one and all read *Paradise Lost*), I asked him why God made some angels, a third, to be precise, prone to pride and jealousy. He shot right back: "Because he wanted all this to happen"—the very answer to justify Milton's ways to God.

My thanks to my colleagues in Annapolis: Tom May, who told me a number of interesting things that I've made mine below, and Jonathan Tuck, who looked at the piece with a keen eye.

After completing this piece I co-led a week's worth of alumni seminars on *Paradise Lost* with my colleague David Carl in Santa Fe. In its course pretty much everything I had noticed was brought on the scene and a lot more (much of it by my co-leader), which is here incorporated.

Eva Brann is a tutor and former dean at St. John's College, Annapolis.

1. Is there a Subtext?

Milton's *Paradise Lost* is a poem of such panoramic grandeur and such human acuteness as may wean one—and has even weaned me—from a lifelong exclusive Homerophilia. Partly its attraction is that it is insinuatingly suspect. I keep having the sense that something is going on that runs right counter to the overt text. There seems to be a separate, opposed meaning. Should it be called a hidden agenda, a subtext? On the supposition of trust—to which I warmly subscribe—what the words in a book say is what the author means; it is simply the reasonable faith that the writer knows how to express himself. So if an attentive reader discerns an under-meaning, there is in fact a subtext, a second probably more seriously meant meaning. Such occulted meanings are associated with esotericism, “insiderism,” the notion that the author speaks with a forked tongue—one text for the naively simple-minded, another for the initiabile. The purpose is to protect the author from misapprehension by ungifted, and from persecution by orthodox, readers.

But I don't think great authors are often in that mode. The deep matters they raise are too well guarded from over-easy access by their inherent difficulty to want the shield of obscurantism, while from imputations of heterodoxy there is really no protection; its odor cannot be masked.

Consequently I have a feeling, just a sense, that something much stranger than the double intention of a subtext runs through *Paradise Lost*: that Milton's judgments denigrate what his representations magnify, that his characters contradict his condemnations and justifications. I have no idea how much a close study of his published opinions or a deep penetration into his private thoughts could establish the truth; I feel terminally baffled by the points I'm about to make. I keep having the sense that some truth in this cosmic Christian drama keeps asserting itself to Milton as poet which, as a theologian, he suppresses. But that notion implies that the story of this temporal episode within eternity is not

altogether a made fiction but has the power of unintended consequences that belongs to living truth; I just don't know. So I'll set out my sense, in brief.

2. Satan's Eve: The Schismatic Pair

Satan lies in wait, hardly hoping that he “might find Eve separate.” “Eve separate he spies” (9.422, 424). She has separated herself from her consort Adam—“split,” as our young now say. It is a good word, the English for the Greek verb whence comes “schism,” breaking away. Satan, in turn, addresses her as “sole wonder” and presents himself as “single” (9.532, 536). He often speaks of himself as “alone” (e.g. 2.975, 3.441), but “single” had then as now another meaning as well: unmarried. And surely he woos her; he is the primal seducer. But it doesn't take much. Eve, that crooked bone, is a born schismatic as Satan is a created one. Or it is at least a great question just how he and his host of fallen angels come to be heaven's splitters, the aboriginal protestants.

Here is how they are a pair, alike in features that bear the name of badness in Milton's book, but are attractive in description, and what is more have the stamp of approval in our day.

First then, Eve too wants to be alone. We respect that: “I need time to myself, I need space.” She is indeed the instigator of her separation from a weakly reluctant Adam. “Eve first” speaks up: “Let us divide our labors”—she is the inventor if not of the division of labor then of separate work spaces!—“Sole Eve, associate sole” he answers, meaning more than he knows, the clueless man, but then he gets it: “but if much converse perhaps / Thee satiate, to short absence I should yield”—though she has pleaded efficiency rather than surfeit (9.205 ff.). He, the “patriarch of mankind,” lectures her on free will: “O woman. . . .” But “Eve / persisted, yet submiss.” It is what we have learned to call the

passive/aggressive mode, the underdog's determined self-defense.

She is, like Satan, a dissimulator who keeps some things private. For she has had a week to ponder Satan's night visitation in which, "Squat like a toad" he whispered suggestions in her ear (I imagine the left, for this is surely a parody of the impregnating Holy Spirit who comes to the Virgin by the right ear in many late Medieval paintings) and manages to "raise / At least distempered, discontented thoughts" (4.806). Thus she surely has more in mind than mere efficiency in weeding Paradise as she separates from her husband. As she will later say: "Was I to have never parted from thy side? / As good to have grown still there a lifeless rib" (9.1153).

There is a whole list of similarities of situation and likenesses of character between the fallen angel and the woman, for which I could cite book and line: Both are kept at a remove from their God, he by the Son, she by her mate. His rebelliousness is proudly asserted, her resistance submissively masked, but both have that in them that is ready to abrogate obedience: "Our great Forbidder" she calls God, and Satan calls him "the Threat'ner" (9.815, 687). Satan is a brilliant sophist on the ancient model, but his clever proof to her that a God who inspires fear is no God, so that her "fear itself of death removes the fear" (9.702), is matched by her clever musings: "good unknown, sure is not had, or had / And yet unknown, is as not had at all. / In plain then, what forbids he but to know, / Forbids us good, forbids us to be wise? / Such prohibitions bind not" (9.756).

She is willful, restless, venturesome, poignant in her lapse, proud as the mother of mankind. Satan is willfulness incarnate, a great engineer, the original Adventurer (10.440), both as explorer and in the older sense of undertaking grand ventures, such as the development of Hell, the colonizing of earth, and the sponsoring of the great highway that makes Hell and this world "one continent of easy thoroughfare" (10.392). He is, in fact, a Promethean figure, a god at odds with his Chief, who is a patron of invention and, in his

perverse way, a benefactor of mankind (Sec. 1). He is the instigating cause of the earth's obliquity, that skewing of the terrestrial pole which brings us seasonal variety and moral diversity; he is the ultimate reason for human mortality and the succession of generations (how on earth would Eden have held all the promised increase of immortals?), in short, of history. There is true pathos in the racking pain of his inability to love: About to spoil Paradise, he curses familiarly but eerily: "O hell!" he says, seeing the bright spirits, the humans, "whom my thoughts pursue with wonder and could love" (4.358). There is real candor in his confession of unwillingness to repent: He concludes a meditation on his certain relapse were he to submit with a chillingly final choice, "Evil be thou my good" (4.110). And there is residual receptivity to the influence of innocent grace: Seeing Eve, alone, "that space the Evil One abstracted stood / From his own evil, and for the time remained / Stupidly good" (9.463).

Satan has been said to be modeled on Iago, literature's most notorious bad man. They are both, to be sure, racked with resentment for being passed over by their superiors, but there is an enormous difference in their stature: Iago suffers meanly and mutely, Satan grandly and candidly—at least by and to himself.

Eve cannot match his stature, but there are two capstone transgressions in which they are nearly equal. One is the drive to explore, experiment, experience—as he sails through the uncreated void to explore the created world, she dreams of flying with him to behold the earth in its immensity, the first human to ride the skies. The second is the desire for godhead: He thinks himself God's equal, and she, eating, has Godhead in her thoughts (9.790).

3. Eve Separate: The Mother of Modernity

In short, they are the original moderns, he in God's universe, she in our world. For there is a generic modernity: asserted individual will; unbounded experimental science (whose root meaning is, wonderfully, the same as that of schism: dividing,

cutting off); chameleon-like adaptability (Lucifer-Satan is a master of transformations, willed and imposed: cherub, toad, serpent; Eve too undergoes some pretty dramatic changes); future-oriented temporality (here Satan and the Son cooperate, one to make sin endemic, the other to make salvation attainable); and godlike creativity (such is attributed to man by Pico della Mirandola in that manifesto of proto-modernity, the “Oration on the Dignity of Man” of the 1480’s: Adam, man, has no fixed being; rather “our chameleon” assumes by his own free will whatever form he selects, and so he can be as God).

But this perennial possibility is realized predominantly in historical modernity, our epoch, within which we are temporal compatriots. We are indeed the progeny of Eve, for with her all its deeper characteristics originate, above all narcissistic individualism, the thirst for liberation, the lust for experience, a hunger for equality, and a drive to resolve all mysteries, “to leave no problem unsolved,” as a founder of modernity puts it (Vieta, *Analytical Art*, 1591).

There is a startling story Eve tells Adam, a story of her first awakening into consciousness (4.449). “With unexperienced thought” she goes to a smooth lake, bends over it—and falls in love with what she sees, pining for her own image “with vain desire”; she is the first self and image worshiper. When she first sees Adam she doesn’t much like him; he is “less fair, / less winning soft, less amiably mild.” She runs away; Adam tells her that she is part of him, body and soul, and she yields. Her first love is herself—even before Satan leaps into Paradise. Is self-love ever innocent?

Now she gets what she is longing for, experience and experiences, discovery by trying things out and stimulation by affects deliberately aroused. She has eaten of the Tree of the Knowledge of Good and Evil, which the Tempter calls “Mother of science” (9.680). She has, instantly, grown “mature in knowledge.” She knows what to call her fascination: “Experience, next to thee I owe, / Best guide;” “thou. . .givest access. . .” to secret wisdom (9.807). And in short order she

invents novelties now well known to us; this wisdom of hers has much of applied science, particularly political and psychological know-how. She tells an outright, very politic lie, the original lie on earth: She figures first that she might keep the secret of the fruit so as to “render me more equal, and perhaps, / A thing not undesirable, sometime / Superior; for inferior who is free?” (9.823). After this very contemporary manifesto of family politics, she reconsiders to herself: What if I do die, as promised, and he takes on another Eve? Better to die together. But to him she cleverly claims that her “growing up to godhead” was all done for his sake, and that he must join her “lest thou not tasting, different degree / Disjoin us, and I then too late renounce / Duty for thee, when fate will not permit” (9. 883). A barefaced, self-serving lie!

Of course she has already invented drug-taking and having ecstatic experiences, and instant knowledge; experiential learning too will be her invention (10.967). Shortly she will propose birth-control—“willful barrenness”—and suicide to him (10.987, 1001, 1042). Ask where all the snares and escapes of our time come from, and the answer is: Eve. To him she calls herself the “weaker sex” (9.383), for that is what he thinks, but her submissiveness hides a huge ambition: Satan gets to her by addressing her as Queen of the Universe, Empress of the World, “a goddess among gods, adored and served” (9.547). It cannot be a really meek, dependent woman who glories in such appellations; it is, after all, what domineering men want as well. Recall that the primary, the horror-inspiring transgression of Mr. Kurtz in dark Africa is that he accepts worship and human sacrifice as a god, and he is a very demon of force. If anything she’s a born outlaw: To the Serpent she interprets paradisaical life as one prohibition, and for the rest “we live / Law to ourselves, our reason is our law” (9.653).

But from one perspective she’s no outlaw nor a rebel either. Our political progenitor, Locke, points out that *rebellare* means “to go back to a state of war,” and that the true rebel is the contract-breaking tyrant, not his imposed-on

subjects; they are revolutionaries (*Second Treatise*, para. 226). Now Satan can claim that his monarch has in fact revoked, if not a social contract, then a heavenly understanding, and Eve does claim that the single prohibition is irrational in principle and defectively promulgated: She knows neither why the tree is forbidden, nor what the punishment means, nor when it will be imposed.

To return to my initial perplexity: There is no question that the above is a skewed version of these events, that Milton expresses more respect for Adam than for Eve, that he is not unsympathetic when he allows Adam to call her “that bad woman” (10.837), that Satan is the Evil One. There are formulaic explanations for my unhistoric perspective: Milton’s poem sets out Christian doctrine, not necessarily orthodox but fervent; I am a post-Christian modern who believes that the soundest part of modernity is rooted in pagan philosophy. So what seems pernicious to him seems admirable to me. Or, alternately, Milton was in fact a revolutionary, a republican, a defender of regicide, so naturally he has some sympathy for the adverse party in heaven and on earth. Both explanations have plausibility, and neither resolves the perplexity: How do Satan and Eve come to be such exact types of modernity? Is our world Satanic or was Hell Luciferic, “light-bringing”?, meaning: is our present condition the consequence of a devilish seduction—as Goethe’s Faust sells his soul to the devil for the boon of restless experience and grand enterprise—or is it really the other way round: that Hell was from its founding the place of enlightenment and progress—and we moderns found that out?

4. Domestic Adam: The Clod Erect

And then, who is really dominant in the Original Pair? The splendor of Adam’s looks is conveyed in sonorous lines. Satan sees the pair, distinguished from the other creatures by being “erect and tall, / God-like erect, with native honor clad / In

naked majesty. . . though both / Not equal, as their sex and not equal seemed; / For contemplation he and valor formed, / For softness she and sweet attractive grace, / He for God only, she for God in him: / His fair large front and eyes sublime declared / Absolute rule” (4.288).

Here is what is odd. That Adam is a well-made creature of fine bearing and natural dignity, a good man and loving husband, is unquestionable. But not contemplation, nor valor, nor absolute rule are in fact his forte. He is, to put it plainly, an upright klutz, one of those amiable, fine males a female might well cling to, well knowing she could run circles around him—and so Eve does.

As for contemplation. In that wonderful interlude, Books 5-7, the archangel Raphael is sent to Paradise to warn and instruct Adam—Adam, not Eve, who sits listening “retired in sight” (8.41), having served the angel a paradisaical meal, which the angel, hilariously, falls to and begins “with keen dispatch / Of real hunger, and concoctive heat / To transubstantiate” (5.437). She listens on the sidelines to the story of Satan’s war and defeat. To be sure, it all comes too late; he has already leaped into Paradise and entered her imagination in a dream—part of Heaven’s mismanagement I’ll talk of below. But when Adam’s “countenance seemed / Entering on studious thoughts abstruse” (8.39), that is, when the theological account of Heaven’s battles and earth’s creation are done and the astronomical part begins, she goes off to her gardening “not as not with such discourse / Delighted, or not capable her ear / Of what was high,” but preferring to hear it from her husband; the angel, though gracious, is too stiff for her.

Here I must interject two observations: first, the question Adam asks that sets off Raphael’s account of hypothetical rational astronomy is a cumbrous version of one asked him by Eve the night before, together with assurances of submission: “God is thy law, thou mine,” she begins and then gives the loveliest speech of companionable conjugality imaginable: “With thee conversing I forget all time / All seasons and their

change, all please alike" (4.637)—to end it all abruptly by posing the most embarrassing question of celestial mechanics: "But wherefore all night long shine these, for whom / This glorious sight, when sleep has shut all eyes?" She wants to know nature's purpose, and by implication, who's at the cosmic center. He gives a confidently ignorant answer, but knows enough to ask the angel: "Something yet of doubt remains. . . ." When he computes the world's magnitude (he actually can't), how is it that the firmament with its numberless stars seems to roll through spaces incomprehensible (he's a natural Ptolemaean, as are we all) "merely to officiate light / Round this opacous earth" (8.13)—same question, more Latinate vocabulary.

Second, Raphael gives, oddly, the Catholic answer. The preface by Bishop Osiander to Copernicus's *On the Revolutions of the Heavenly Spheres* (1543) tries to neutralize the heliocentric revolution by ranking it as merely an alternative hypothesis, a mathematical simplification devised in Plato's phrase "to save the appearances," that is, to mathematicize the phenomena. Raphael tells Adam, never mind fact, "rather admire." God has left his heavenly fabric to human conjecture and disputing, "perhaps to move / His laughter at their quaint opinions wide / Hereafter when they come to model heav'n / And calculate the stars . . .to save appearances" (8.75). So much for mankind's first and grandest and most theologically fraught science: "What if the sun / Be center of the world. . .?" Of course the angel knows, as we know from Copernicus, that when astronomical obliquity enters the world after the fall, when equator and ecliptic come apart at an angle, so that the sun appears to spiral up and down the earth making seasons, the more economical way to effect this phenomenon is to push the earth's pole askew. Yet even then Milton insists only that "Some say he bid the angels turn askance / The poles of earth twice ten degrees and more. . .some say the sun was bid turn reins" (10.668) on the now-skewed elliptic—c. 23° 51', in

fact—which obliquity produced corruption and pestilence and variety of season and weather for us.

And Adam, the biddable, is "fully" satisfied when enjoined to be "lowly wise," to descend to "speak of things at hand, useful." For him "experience," which widens Eve's horizon, teaches "not to know at large of things remote" (8.173); he is content to be temperate in knowledge. So much for contemplation, which means, after all, taking a wide point of view, theorizing. Eve is—until cowed by her lapse—more insatiable for wisdom than that, and a keener inquirer.

Now as for valor. We hear of his proneness to passion, which he is warned against by Raphael (8.635), and of his pusillanimity—he has to be told to have "self-esteem" (8.572), that contemporary buzzword—and he is, though inconsistently, upbraided by Eve for his weakness in letting her separate from him (10.1155) and allowing Satan to prevail. Michael, sent to comfort Adam, goes so far as to answer thus his accusation that the beginning of man's woe is by women: "From man's effeminate slackness it begins" (11.634). This sedentary "domestic Adam" (9.315) has a stodgy but infirm virtue that is no match for mobile, venturesome Eve's spirit of independence. In the end it is he who cannot bear to be without her; she is, after all, one of his bones. So much for valor and for authority: "Was she thy God?" the "sovrain Presence" asks him (10.145); the very thought had occurred to Eve (9.790). But at the least she is used to having the final word, one way or another: The "patriarch of mankind" has spoken "but Eve persisted, yet submits, though last. . ." (9.376)—a grimly hilarious line written by a two-timed husband.

And he's slow (though sweet) and inattentively clueless. Eve has told him the tale of her self-love and how he at first repelled her. When he regales Raphael, at the end of his visitation, with the story of his own creation and of Eve's, it turns out he hasn't listened at all: He thinks she ran from him out of coyness; she "would be wooed, and not unsought be won" (8.503). And when the great disaster has come, and

Eve, doomed, offers him the fruit, why does he not, simple man, think beyond the two options of dying with her or getting a new Eve? Why doesn't he refrain from eating and intercede for her?

Clearly "domestic" and "dominant" are at odds here—maybe it is the reality of the Adamic character, that ensouled clod of earth, that is prevailing.

5. Poetic Milton: The Devil's Party

Much stranger things are to come, so this might be a moment to consider theological poetry. Blake says that Milton wrote in fetters of Heaven and at liberty of Hell because "he was a true poet and of the Devil's party without knowing it" (*The Marriage of Heaven and Hell*). I don't know what *he* meant, but I think I know what it means: The devil is—or wants to be—autonomous, a rule unto himself (as Eve thinks they are in Paradise); he is literally a heretic—for "heresy" is a Greek word that means "choosing," or as we redundantly say, "choosing for oneself." In the realization of self-will and self-rule, he becomes innovative. Novelty is not new with him: Heaven starts it, knowing the possible consequences, which are therefore not wholly unintended. So also is this poet a maker of newness: David's Muse, Milton's first muse, is to sing "Things unattempted yet in prose or rhyme" (1.16; not the first one, though. Jon Tuck tells me that the line comes from Ariosto). His Raphael tells Adam "The secrets of another world, perhaps / Not lawful to reveal" (5.569). Milton writes a new epic, not "sedulous by nature to indite / Wars" and other old heroic and chivalric shenanigans (9.27), yet his great interlude is a magnificent war poem, though perhaps too embarrassing to Heaven to be revealed—Milton reveals it. We might well ask: Where does the poem leave Scripture? The poem is far more revealing; is it revealed? It is far more visible, a huge, magnificent moving picture, a blind poet's telling—and showing—"Of things invisible to mortal sight" (3.54), "lik'ning spiritual to corporeal forms" (5.573). Is the imaging of spirits permissible? It is "in nightly visita-

tions unimplored" dictated to him by his second Muse, his "celestial patroness" Urania (9.21), though a heavenly, not, as far as I know, an orthodox source. To be sure, Milton denies that he means the pagan Muse of Astronomy: "The meaning, not the name I call, for thou / Nor of the muses nine" (7.5). But surely this is equivocation. The inspiration for his books on the cosmos comes from the Greek source of enthusiasm (literally from *entheos*, the god within), one "of the muses nine," though he disclaims her. And so this epic does not replace but absorbs pagan epic and pagan science, and puts Milton in a skewed position of accepting the splendor and deriding the culture of pagan hell (see Sec. 6., below).

To give a name to the poet's peculiar propensity: It is a form of Manicheism, the teaching that evil is real and incarnable. In a long tradition, the Neoplatonists and their Christian partisans held that badness is nonbeing, defect of being. For example, Adam is, understandably, a confused Neoplatonist: When he loses his wonted composure, he nastily calls Eve in turn "serpent," and "this novelty on earth, this fair *defect*" (10.867), not sure whether a feminine being, that "rib / Crooked by nature" is lacking in something or oversupplied with "pride / And wand'ring vanity." Milton's Satan has no such doubts: To him his evil being is real and is accepted, no, vaunted as such, just as the darkness of hell is a paradoxical illumination. Surely the poet who produces a brilliant personification of evil is a perhaps unwitting, perhaps half self-admitted follower of Mani, not exactly of his doctrine but of the Manichean propensity for the personification of the kingdom of darkness.

There is another huge work that makes a novel tale of a sacred story. As Milton had expanded the second and third chapters of Genesis, comprising that book's two alternative accounts of the creation of man, into a huge epic, so Thomas Mann developed his novel, *Joseph and His Brothers*, from twenty-six chapters in Genesis, telling the story of Jacob and his sons into nearly two thousand pages; he was executing a plan conceived by Goethe. But Mann has his "irony" to

extenuate this dubious and so doubly engaging enterprise. He hovers above faith, and his ultimate belief is in the allusive imaging and reference-fraught story-telling itself.

Perhaps the poet's—and this poet's—indefeasible partisanship for the devil, that sets him “more at liberty” when writing of Hell, is in just this re-creative activity: Satan thinks he might not be a creation but an original, a self-created being (5.860). Poets too want to be original, themselves creators, if not of themselves, of their worlds. It makes them great iconodules (image-servers), for they love their creatures. Iconodulia, a term from the old iconoclastic (image-breaking) battles culminating in the eighth and ninth centuries, was by the opponents understood as idolatry (idol-worship), praying *to*, not *through*, the icon. The charge goes way back, to that ancient quarrel between poetry and philosophy spoken of in Plato's *Republic*, where images are devices to distance us from Being by ensnaring us in the desire for sights (601 ff.). Iconodulia is a sin of which Satan, the proudly unattached leader of that “atheist crew” (6.370) is not guilty. But who can say that blind Milton did not love his invisible universe, made by him and made visible to himself, better than the real world made by God and made invisible to him, and, perhaps, better than the ultimately invisible God? He does not, in any case, succeed in making God lovable—or his Son interesting: “Hail Son of God,. . .thy name / Shall be the copious matter of my song / Henceforth . . .” (2.412), he says after two terrific books about Satan. But the “copious matter” of the remaining ten is not the Son either, but more Satan—and Eve.

I'll be concentrating on the problematic vision and thought-raising qualities of Milton's poetry, so I want to make here a declaration of love to the texture of words through which these are delivered: the steady English beat of the more than ten thousand iambic lines with their ever varied stresses in the hyper-English produced by the mixed Latinate and Anglo-Saxon diction—which with a little practice begins to read like mankind's original language.

6. Insipid Heaven, Sapient Hell

The first two books of *Paradise Lost* are of paradise lost, of hell gained. Heaven itself comes on the scene only later, mostly at war. And this is well, because it is not attractive. I recall Bernard Williams saying in an encyclopedia article on death that Heaven's eternity must be boring—all that everlasting monotonic intoning. (In fact, in Milton's *Paradise* they play harps and occasionally sing in parts. Bach knew better; witness the glorious victory march-by in heaven on the words of *Revelation* 12:10, “Now is the salvation and the power and realm and the might” celebrating the Son's defeat of Satan [Cantata fragment 50]). So the notion of celestial tedium is wrongheaded, for incorporeal substances don't experience the weariness of the bodily senses. What is offputting in the poetry of heaven is God's ultimate invisibility, for it is simply mystifying how formless light can by mere effulgence in fact produce any shaped copy, be it an ethereal image—the Son (6.680)—or an embodied one—man. I suppose there's plenty of theology about it. In any case, God is heard out of invisible obscurity: “Glorious brightness. . . / Throned inaccessible” (3.375); to Satan it looks like “Thick clouds and dark” (2.263), to Heaven it's a “golden cloud” (6.28); sometimes God speaks vengefully, from a “secret cloud” (10.32).

He often speaks peremptorily and on one occasion even with pointedly offensive vulgarity, when he promises to seal up hell: “See with what heat these dogs of hell advance” —as if they were bitches. He has suffered them to enter and possess earth, to puzzle his enemies, “That laugh, as if transported with some fit / Of passion,” thinking that it has not happened on purpose. No, they were called up on purpose, “My hell-hounds, to lick up the draff and filth” of man's polluting sin, so that gorged they might nigh burst “With sucked and glutted offal” (10.625)—infernally vacuum cleaners. In a human, that's surely gross talk.

But Heaven itself, with its unvarying obedience, is vapid—not surely to inhabit but, unavoidably, to read about. It is the poetic problem of goodness, which is, *ipso facto*, even-tenored, uneventful, not the stuff of intense drama or vivid imagery. It does not have the snags and hollows that throw shadows and catch our interest: Perfect globes are intellectually perfectly beautiful, but who wants to look at their image for long? It is why newspapers never report that two hundred and eighty million people went to do respectable work and came home to enjoy their families, but always that someone or other killed, raped or stole. So Heaven is not interesting until there is civil war, and even then the so easily victorious Son fades against the brilliant, beaten Adversary, whose legions the heavenly general sweeps so easily over the brink into chaos, like Indians driving herds of buffalo over cliffs into canyons. Moreover, who can exonerate Heaven from the charge that in its war was born the notion that might makes right—and the hoary justification that right is in this case might.

As if to make up for its Chief's invisibility and its remaining inhabitants' spotlessness, Milton makes heaven and its furniture baroquely opulent. The Son's war chariot with its four Cherubic faces and eyes all over, made of beryl, crystal, sapphire, amber and all the colors of the rainbow, is extravagantly strange (6.753); there is no such vehicle even in Revelation, one of the Biblical sources for the war in Heaven (12:7). This is not the style of Hell.

It is, to begin with, a place of somber and restrained beauty. Opulence calls for Corinthian capitals, which are, as Palladio says, the most beautiful and elegant of the orders of columns. Pandemonium, however, rising "like an exhalation, with sound / Of dulcet symphonies and voices sweet / Built like a temple" (1.711)—a pagan temple, of course—employs the severe and chaste Doric order with a golden architrave, for gold is mined in hell. Mulciber, Greek Hephaestus, the most gifted of the pagan gods, is the architect. The inside is illuminated by starry lamps.

It is a People's Palace, and there a consultative parliament is held, a large inclusive synod (6.156) such as is never called in monarchic heaven. Hell is a sort of democracy. Its presiding chief was once Latin Lucifer, the "Light-bearer," so called for his former brightness (7.131), but in my anachronistic ear there sounds also the word Enlightenment). Now he is Hebrew Satan, the "Adversary" and Greek Devil, *diabolus*, the "Accuser." He is a revolutionary, a "Patron of Liberty," not only in seeming, as Abdiel, the counterrevolutionary angel, claims (4.958), but in fact, as one who has been made "free to fall" (3.99), has claimed that right for himself, and finds his companions worthy of liberty and honor (6.420). Thus he is termed by his lieutenants "Deliverer from new lords, leader to free / Enjoyment of our right as gods" (6.451). He has a bill of accusations against his tyrant, not unlike the one found in our Declaration of Independence; he accuses God of enforcing vassalage, "Forced hallelujahs" (2.243), and, ironically but truly, of requiring image-worship (5.784) in interposing the Son, his image, between himself and his angels. Interposition is indeed the sub-theme of Milton's justification—strange term—of the ways of God to man: the Son as intermediary between God and the angels and as intercessor in man's behalf, Adam as God's representative to Eve and interpreter to her of Heaven's messages, and even Satan as Hell's emissary to earth. This God is a *deus absconditus* whose ways are incessantly indirect.

Satan is, moreover, a real leader, intrepid, of unconquerable will (2.106). He heartens and rallies his troops, and they respond to him with trusting enthusiasm (1.663), rejoicing in their "matchless chief" (1.486). He is strangely like the Son in willing to volunteer for fatally dangerous service to his people—to go through Chaos where no devil wants to go, to break out of by now homey hell to explore new lands for his people's occupation (2.402); thus he is raised to "transcendent glory" (2.427).

Proud, rebellious, and monarchical in his spirit though he is, he knows how to assure his loyal band of their equality: "O

friends” (6.609) he addresses them at their great crisis, but even before his magnificent speeches to them were all about equality—their equality in freedom if not in power. For as Abdiel, the Tory, points out, Lucifer is himself a prince. But he presents himself as *primus inter pares*, first among equals: No one more often utters the word “equal” linked with “free”: “or if not equal all, yet free, / Equally free; for orders and decrees / Jar not with liberty, but well consist. / Who can in reason then or right assume / Monarchy over such as live by right / His equals, if in power and splendor less, / In freedom equal?” (5.791). And as he speaks, so, it appears, he rules in the spirit of our Declaration: that all angels are created equal, that they are endowed, Satan would say by their heavenly nativity, with certain inalienable rights, among which one is liberty—that is, their freedom derives from an equality of rights.

From Satan’s politics to his endowments: He sits exalted, “by merit raised / To that bad eminence” (2.5). He is a sublime psychologist and the only wit, a mordant one, in this high drama—except of course for Milton himself, whose wit, insinuated into the action through his whiplash enjambments and his fork-tongued puns, is borrowed by Satan who can have no insight or wit but his maker’s. In Satan’s “Indeed,” when Eve naïvely tells of their perfect freedom in heaven except for the forbidden tree (9.656) you can hear the supercilious Englishman. When he tells Hell how he seduced Man he adds, with a witty contempt: “with an apple;” it’s a sheer, wickedly derogatory invention; I don’t think it was just a juicy apple, though Satan’s put-down prevailed. Here is a pertinent ditty (see Sec. 11.) from the early 15th century:

And all was for an appil,
 An appil that he tok.
 Ne hadde the appil taken ben,
 The appil taken ben,
 Ne hadde never our lady
 A bene heven quene.

Blessed be the time
 That appil taken was.
 Therefore we moun singen
 ‘*Deo gracias.*’

But Satan is more than smartly cynical; he is a great inventor and engineer. The manufacture of that tremendous contrivance, the cannon, which he builds in heaven, that devilish engine which nearly routs the heavenly host in the most tremendous cannonade I’ve ever read of, is vividly described by Raphael in Book 6. Like Persian Xerxes, who cut a mountain off from its mainland (Herodotus 7.22), he refigures nature: His offspring Sin and Death cut through Chaos “by wondrous art / Pontifical” (that is, bridge-building, 10.312) to join Hell to Paradise.

But back to Hell itself, a place of relative harmony: “O shame to men! Devil with devil damned / Firm concord holds, men only disagree” (1.496). It is a place of music, of “partial,” that is, of complex polyphonic sound, as contrasted with the simple celestial unisons, I imagine. It is also “partial” as being of the devil’s party, of their heroic deeds, and it takes with “ravishment / The thronging audience” (1.552).

There is, above all, the sweetest soul-charming discourse: high reasoning “Of providence, foreknowledge, will and fate, / Fixed fate, free will, foreknowledge absolute.” Round and round it goes as do conversations in a serious college: “And found no end” (1.560). They talk, as do we on earth, philosophy: of passion and apathy, of good and evil, of happiness and final misery. They have the experience for it; it is not talk abstracted from life but real inquiry.

“Vain wisdom all, and false philosophy,” this passage concludes. That is Milton’s way with Hell and the devils. It and they are depicted gloriously and dismissed ignominiously. It happens over and over. The representation raises what the judgment crushes.

Hell is altogether puzzling. Following an old Patristic tradition, Milton has all the fallen angels assume, as devils,

the form of the pagan gods, some Levantine and horrible, some Greek and graceful, all vivid (1.375) and more distinctively individual than ever were the loyal archangels. All are beautiful, and though their looks deteriorate, as angels they can never be all bad in soul or all spoiled in form (1.483).

Satan, as I have imagined him, is the aboriginal modern, not only in his politics, but perhaps most of all when he is at home in hell where he asserts a modern hallmark: subjectivity, solipsistic ideation, inner-world creation: "The mind is its own place, and in itself / Can make a heav'n of hell, or hell of heav'n. / What matter where, if I be still the same. . .?" (1.254). But he is not only a post-Christian, he is also a pagan pre-Christian; he encompasses the human salvational episode, coming before and after as it were. As G. K. Chesterton says: "It is profoundly true that the ancient world was more modern than the Christian" (*Orthodoxy*, Ch. 9).

As fallen Lucifer, in Hell Satan belongs to the Greek crew, though more as hero than god—albeit as god too. For like the Christian God he gives birth, though not to a Son but to a daughter, and like Zeus he gives birth through his head, not to wise Athena but to canny Sin. Yet primarily he is like the *Iliad's* Achilles, first in battle, and offended by a sense of injured merit (1.98). The relation is, however, perverted for the occasion, as displayed in Satan's adaptation of Achilles' words in Hades: "I would wish rather to be a slave in service to another. . . than to be ruler over all the dead" (*Odyssey* 11.488). For Satan, at home in Hell, says instead: "Better to reign in Hell than serve in Heaven" (1.263); it is how he proudly counters good Abdiel's "Reign thou in Hell thy kingdom, let me serve / In heav'n God ever blest" (6.183).

Milton, to be sure, disowns Achilles: His is an "argument / Not less but more Heroic than the wrath / Of stern Achilles" (9.13). And he most assuredly disowns the philosophizing of Hell. In *Paradise Regained* Satan advertises ancient wisdom as the final temptation of Jesus, sounding much like the catalogue of a Christian college trying to persuade applicants that a liberal education should include Greek philosophy: "All

knowledge is not couch'd in Moses' law, the Pentateuch or what the prophets wrote, / The Gentiles also know, and write, and teach / To admiration, led by Nature's light" (*P.R.* 4.225). So "To sage philosophy next lend thine ear, / From Heaven descended to the low-rooft house / Of Socrates" (4.272). Jesus rejects it all, though, like Milton, he is an admirer of Plato and his Socrates. He says that Socrates "For truth's sake suffering death unjust, lives now / Equal in fame to proudest Conquerours" (3.96), but explains that this "first and wisest of them all profess'd / To know this only, that he nothing knew" (4.293). Even so he rejects Satan's temptation. He neither knows nor doesn't know these things; his "light is from above;" any great reader must needs be "Deep verst in books and shallow in himself" (4.286). In this spirit Milton comments on the pair asleep in Paradise: "O yet happiest if ye seek / No happier state and know to know no more" (*P.L.* 4.774).

So heroic poetry, philosophical inquiry and book-learning appear to be rejected as Satanic. But that's the trouble; they flourish in or about Hell, which is a display case of antique lore and heroic character and liberal artistry and free inquiry and sophistic skill. Belial is Hell's most beautiful god "For dignity compos'd and high exploit"—here comes the customary whiplash—"But all was false and hollow," for "he could make the worse appear / The better reason" (2.110); this is verbatim the sophistry attributed to the Clouds in Aristophanes' play, those clouds that are parodies of Plato's Ideas and the sponsors of Socrates' Thinkery. In Hell is to be found all that was exciting in its splendor or rousing in its dubiousness in paganism. In Hell as in life there is no escaping its attraction, and all the poet's damning postscripts cannot dim the glories of his "infernal pit." Milton's Satan speaks gallantly; Milton explicates: "Vaunting aloud—but wracked with deep despair" (1.126, my dash); it's still the gallantry that resonates.

"Insipid" means tasteless, savorless, as *sapor* means taste, savor: Milton's Adam, influenced by the taste of the

forbidden fruit of knowledge, discovers its etymological connection with sapience, wisdom (9.1018). Hell is sapient as hell; is that an inherent truth asserting itself?

7. Mismanaged Monarchy

If Hell, when not racked with supererogatory spasms such as the yearly Hissing when all the devils turn into writhing snakes (10.508), is a well-run republic, Milton's Heaven can be said to be a mismanaged monarchy or firm. The archangels' inefficiency cries, so to speak to high heaven. Set to watch out for escapees from Hell, Uriel, in his simplicity, is, "for once beguiled" by Satan's cherubic disguise—though the heavenly gods are supposed to know good from evil (3.636)—and directs him straight to Eden, where he evades the angelic pickets posted at the gates by simply leaping over the wall of Paradise. God lets it go: "be not dismayed," he says to the unsuccessful sentinels; this intrusion "your sincerest care could not prevent" (10.37)—so what was the point of posting them? Raphael is sent too late to prevent the capture of Eve's imagination, and, by his own account, the heavenly army under Michael, outnumbering the forces under Lucifer's command two to one, are beaten; the Son alone saves Heaven (Book 6).

But that's the least of it. To take a coolly secular view, the ruler of this polity is either deliberately disruptive or disregards some prime rules of management: Don't add intermediate layers of authority; don't make yourself inaccessible; don't rebuff your insiders; if it ain't broke, don't fix it. Everyone knows what discontent the intromission of a provost between the president and a faculty induces in it, or the upset that bringing in a vice-president from the outside and disappointing fair expectations causes in companies. This is exactly what happens in Heaven. Once all worshiped and obeyed God alone, a God who, though inaccessible to sight, was equally so to all. Then one day there is a newcomer, a Son, born not created. Though it is not clear that he appears

after the angelic creation, it is clear that he is one fine day proclaimed and anointed—and set over all the princely angels, God's loyal servants, as vice regent, a head to be acknowledged Lord (5.609). It is a novelty, an innovation whose necessity is not apparent; God seems to be, in Caesar's words, simply *cupidus rerum novarum*, "avid for new things" (*Gallic Wars* 1.18). He does not need a Son. Indeed when Adam, shortly after his creation, asks God for a mate, God slyly joshes him "as with a smile": "What think'st thou then of me. . . / Seem I to thee sufficiently possessed / Of happiness or not, who am alone / From all eternity, for none I know / Second to me or like, equal much less" (8.403). Either God has forgotten or is concealing that he too now has family, or he is signifying that he needs none. We do know that the Son was born—whenever it was in timeless time—before Adam was made, though, to be sure, the possibility of innovation in an atemporal realm is humanly incomprehensible. "When?" makes no sense in eternity. What's of more human consequence is that Milton's God is playing a dangerous game with Adam: accustoming him to the sense that persisting in one's desire and opposing God's advice is permissible, even possibly successful. For Adam gets his consort.

Naturally some angels, created proud, are outraged at being set at a remove from the throne, at having their rights disrespected and expectations disappointed. Over and over Satan repeats that *this* is the cause—be it the mere occasion or the actual reason—of the rebellion, which is thus a revolution.

The engaged reader (for irreverently deadpan literalism can be a way of respecting the story) has to ask: Is Heaven's action an incitement, an entrapment? God has given the angels free will. Has he made them dissimilar in nature, some more proud, more prone to apostasy, with more propensity to self-assertion and offense-taking? Is he calling these flawed ones out?

Here the question arises whether the angels, to whom God gave the knowledge of good and evil (11.85), know evil

by their own experience or just by contrast to good. The latter *is* conceivable; Socrates in the *Republic* demands that a judge should learn of badness by observation, not from within his own soul (409). Moreover, Satan says to Gabriel that he cannot know what it means to seek relief who “evil hast not tried” (4.896). But then, before the angelic uprising, what evil was there to observe? Do some, a third, have it in them? Is Heaven rife with potentiality for evil, waiting to be realized? Is God indeed planning a razzia, a raid on putative infidels?

God does have foreknowledge of the event. But his argument, that omniscience does not prove determinism, is persuasive. An atemporal Godhead oversees our entire temporal episode as a whole from its beginning to its end. Earth’s history is not, after all, infinite in this story: Hell will be sealed and Heaven opened to man. *Sub specie aeternitatis*, under the perspective of eternity, foreknowledge is not foretelling, since to observe is not to interfere (at least not outside quantum theory). Since we see the past as fixed and conclude that because it is done it cannot be undone—which isn’t even so very true—therefore we think, *a fortiori*, so much the more, that if it cannot be altered it must have been necessary—which is a plain parallogism. No more need God’s sight, which includes the end, fix beforehand what happens; he is no cryptodeterminist. To foresee completely from a perspective outside time is not to predict certainly from causes within.

But it is an entirely different question whether Milton’s God wishes for the catastrophe that he has made, at least and at most, possible. And everything points that way. He leaves Satan to his “dark designs” so that he might “Heap on himself damnation” (1.214); indeed the whole historical episode, from the angelic fall of one who wants to rival God in power to the human fall of one who wants to be like a god in experience to its end in the re-opening of Paradise on earth and the first opening of Heaven to mankind, is an entertainment to the Godhead who watches it as a drama, just as

it is an acute delight to the humans who read it as an epic. Yet while Aristotle allows that epics contain the *plots* for tragedies (*Poetics* 1459), Milton actually switches to the tone of tragedy within his epic: “I must now change / Those notes to tragic” (9.5); thus a serene epic delight is, for us humans at least, converted into that notorious tragic pleasure whose well-known dubiousness lies in our enjoyment of the representation of excruciated bodies and souls. Is it so for God?

To rise from the aesthetic to the ethical: The poem abounds in conversions of good to bad and bad to good, in missed intentions and antithetical transformations. Our labor must be, says the Arch-Fiend, “Out of our evil seek to bring forth good. . . And out of good still to find means to evil” (1.163). On the brink of Paradise, it is no longer transformation he intends but identification: “Evil be thou my good” (4.110); here the distinction between good and evil is not, as in Hell, perverted but simply obliterated. The angels, on the other hand, sing in unison: “his evil / Thou usest, and from thence creat’st more good” (7.615), and God repeats it, meaning just the opposite from Satan. How is the human reader not to be absorbed into all this relativistic confusion? And all this starts with the late fathering of a crown prince.

For there is no question that this is the cause of the revolt: being set aside, twice, once by the newly born Son, once by the newly made image, man. Over and over Satan expresses his sense of wrong, of merit unrecognized; in Hell he may sit “by merit raised / To that bad eminence” (2.5; note, as usual: first some term like “merit,” then “bad”). In heaven God excuses the Son’s elevation: “By merit more than birthright son of God,” (3.309). Lucifer, however—at 5.666, which is the number of the Beast, the Antichrist, in Revelation (13:18)—thinks “himself impaired.” “Deep malice thence conceiving and disdain,” he whispers conspiracy to his “companion dear,” because he feels released from loyalty by the new laws God has imposed: “New laws from him who reigns, new minds may raise.” Then next morning at his palace, he, “Affecting an equality with God,” takes his royal

seat to make that magnificent speech about the equal right to freedom. Injured merit, *ex post facto* laws, subjection are the griefs—God has, “O indignity! / Subjected to his service angel wings” (9.154)—later compounded by the replacement of his own contingent by newly created man. All this is as foreseeable by us as it was foreseen by God: on earth the CEO would be blamed, and the monarch would have a revolution on his hands.

8. Infected Paradise

Paradise is similarly questionable. How are we to go on with Milton’s picture of terrestrial perfection? Do those who will one day fall never stumble, those who will soon need to be clothed—not just for shame but warmth (10.211)—ever get nasty colds before the world is skewed? What happens if paradisaical lushness gets out of control as Eve worries it will, when the leisurely gardeners can’t keep up and growth goes rank? (10.205) Is Eve pregnant, and if not, why not, since passion is from the first practiced in Paradise (8.511)? Do they know death, with which they have been threatened, more distinctly than as something not-good, in some other way than as a blind, mystifying doom? More broadly, do they know some bad before they know evil, some harm before sin? Is Paradise already infected, as the serpent whose head is “well stored with subtle wiles” (9.184) seems to signify, who, “not nocent yet,” is physically “the fit vessel, fittest imp of fraud” (9.89), made in effect to incarnate Satan?

Kierkegaard, in his very pertinent meditation on Paradise, says that innocence is ignorance, it is the spirit yet asleep, dreaming. But the dream is infected with a presentiment of freedom, a “possibility of possibility,” which makes the spirit anxious and, once awake, unresistant to sin (*The Concept of Anxiety* 1.¶ 6).

Eve conceives sin in her dreaming imagination, through Satan’s insinuation. Adam dreams soberly, merely of what is then actually happening and meant to be real: God—in what

“shape divine,” one wonders—guides him, gliding, through Paradise; shows him “the tree whose operation brings / Knowledge of good and ill” which God has set as the pledge of his obedience by the Tree of Life, and warns: “The day thou eat’st thereof, my sole command / Transgressed, inevitably thou shalt die” (8.323); he demands a companion; falls into another sleep, really a half-conscious, waking anesthesia, while his “sinister,” that is, his left rib is removed by God and shaped into Eve (8.460).

Eve dreams wildly, raptly, anxiously of what is to come, and her “organ of fancy” is receptive to evil. We already know that she, who falls in love with her own image, is image-prone, and now she is the first and prime instance for a long philosophical and theological tradition that sees in the human imagination the effective snare of evil: desire made visible and vivid.

One third of the inhabitants of Heaven were open to the suggestion of evil; in Paradise, it appears, one half of the rational beings is so—the imaginative half.

Adam delivers to Eve a well-meaning little lecture on our cognitive constitution. He inventories first judging reason, then “mimic fancy,” and last the five senses. On the basis of these faculties, he trots out a soothing naturalistic explanation of the “wild work” the imaginative fancy produces in dreams from fragments of sensation, when judgment has retired into her private cell.

How wrong he is, the complacent man! He goes on to discourse comfortingly of evil: “Evil into the mind of god or man / May come and go, so unapproved, and leave / No spot or blame behind” (5.117). How would he know, not knowing evil—yet? But, I think, Eve does indeed now know, ahead of him. Thus Paradise is infected *before* the lapse. But it is not by the devil’s temptation, it is by God’s.

For what does the whole arboreal set-up betoken? Near the Tree of Knowledge is the Tree of Life. We learn that more such grow in Heaven, that after the fatal fall, man has to be moved from the proximity of the one in Paradise, for it can

cure mortality (11.94). Why is one of these there at all? Surely the answer is ominous: Fallen humans who ate of it would be fallen immortals like the fallen angels, beyond salvation, incapable of participating in the redemptive history about to begin. Was the primal pair's ejection from Paradise an act of mercy—and if so had this irremediable catastrophe crossed Heaven's mind? What a complexity of divine design!

But that's a side issue; it's the Tree of Knowledge that is at the problematic center of the Garden. Here is the question: Is the fruit of itself deleterious, some sort of spiritual poison, or is it a mere incitement to disobedience? Is the real evil ingestion or transgression? Is its intoxicating effect, which makes Eve so "jocund and boon," a "virtue" proceeding from the fruit itself and the tree's "operation" or from the sinner's mind? Moreover, when they have both eaten and love turns into lust, passion into concupiscence, nakedness into exposure, candor into shame, harmony into hate, work into labor, what has changed? What is "the mortal sin / Original" (9.1003) Of passion and of carnality there was plenty before: "Here passion first I felt, / Commotion strange" says Adam at the first sight of Eve (8.530). Or: "half her swelling breast / Naked met his under flowing gold / Of her loose tresses" says Milton (4.495).

Is that very turn from love to lust the original sin, or is it its consequence? Or is the true primal sin indeed mere disobedience? This last thought is what Adam and Eve cannot entertain: that mere transgression will be punished. (Indeed so far have we come in the way of Eve that "transgressive" is, for some postmoderns, a term of approval and a sign of sophistication.) They both think that the acquisition of knowledge and godlikeness is the virtue of the forbidden fruit. Adam, to be sure, first fixes on Eve's disobedience itself: "how hast thou yielded to transgress / The strict forbiddance" (9.902). But soon, he deprecates the danger that God, "Creator wise, / Though threatening, will in earnest so destroy / Us his prime creatures" (9.938), encouraged to think so by his previous experience with God's leniency. So

he accepts the profit: a "Higher degree of life." Eve, a more subtle reasoner, goes even further: "What fear I then, rather what know to fear / Under this ignorance of good and evil, / Of God or death, of law or penalty?" (9.773) In other words, because she is ignorant of the terms she need not fear anything before partaking, since she doesn't even know what's to be feared; "Here grows the cure for all," she concludes, the cure, that is, for cluelessness.

The trouble seems to be, once more, the unintelligibility of the tree's operation (8.323, 9.796): Is it God's command that threatens or the tree's powers that are dangerous? Is it the fruit that imparts knowledge of good and evil or the fact of human transgression? Is that knowledge an experience or an understanding? Once again, the question is whether their novel unbowered daytime sex with its postcoital recriminations, whether love turned into lust, is the sin or its consequence? And over, and over, is God not only expecting but wishing the outcome?

This last question is perhaps answerable from Milton's perspective. He speaks in the *Areopagitica* of "the doom which Adam fell into of knowing good and evil—that is to say, of knowing good by evil" (my italics). So knowing evil takes precedence, and, accordingly, he, Milton, "cannot praise a fugitive and cloistered virtue unexercised and unbreathed [unexhausted], that never sallies out and seeks her adversary. . . Assuredly we bring not innocence into the world, we bring impurity much rather. . . That virtue therefore which. . . knows not the utmost that vice promises to her followers, and rejects it, is but a blank virtue." To me this signifies that the eating not only caused the world's obliquity but prepared the pair (and its progeny) to live in it, that is, to keep learning by experience and experimentation, as it had begun. But if that is so, then there is too fine a contrivance in it all not to be an intended or at least a wished-for consequence.

And altogether God's gift of free will, this is the occasion to observe, is a curiously strained thing. One of our students,

Christopher Stuart, discussed in his junior essay, which I have before me, an apparently scandalously inconsistent line, spoken by Raphael to Adam. After telling him once more that his will was by nature ordained free, “not overruled by fate inextricable or strict necessity,” the angel says, speaking of all created beings: “Our voluntary service he requires” (5.529). How, the student asks, as we must do, do “voluntary” and “require”—even “require” in the weaker sense of “ask”—go together, when it is God who asks? Doesn’t full freedom extend beyond the liberty to choose between the allowed and the forbidden to the determination of choices itself? Isn’t the deepest, innermost freedom the freedom to set one’s own limits? Isn’t that what autonomy means? No wonder then that Satan harps on his own kind of freedom even more than on equality. He has fully felt that Heaven’s gift of free will has negating strings attached.

These perplexities, however, the sequence and significance of the will to disobedience and its punishment, the eating of the fruit and its effect, the skewing of the world, and the resulting diversity, all seem—at least seem to me—to converge in one type: the turning of love into lust.

When Adam shyly asks Raphael whether the angels have intimate congress he gets a forthright answer delivered with a “Celestial rosy red” smile. The angels “obstacle find none / Of membrane” (8.625); their intercourse is “Easier than air with air, if Spirits embrace, / Total they mix, union of pure with pure / Desiring” (8.625). In Hell too there is passion: Envious Satan sees the man and the woman “Imparadised in one another’s arms,” and bemoans that in Hell there is only “fierce desire, / Among our other torments not the least, / Still unfulfilled with pain of longing” (4.506). In prelapsarian Paradise there is passionate desire and sexual congress, “preceded by love’s embraces,” “happy nuptial league.”

Adam and Eve’s love-making after the lapse when “in lust they burn” inflamed with “carnal desire” is now carnal *knowledge*: Adam harps on Eve’s sapience: “Eve, now I see thou art exact of taste, / And elegant, of sapience no small

part, / Since to each meaning savor we apply” (9.1012). Now “that the false fruit / Far other operation first” displays (note the fricatives), we may ask: What is that operation that turns innocence to lasciviousness and makes them, “as the force of that fallacious fruit” evaporates, wake up from “grosser sleep / Bred of unkindly fumes with conscious dreams / Encumbered.” What has happened that when they rose, they “As from unrest, and each the other viewing, / Soon found their eyes how opened, and their minds how darkened” (9.1046)?

What the fruit has done is to make them sophisticated in sexual taste, *self*-conscious in their bodies, self-seeking in view of the other’s otherness: This is schism all over, the renunciation of trusting obedience in favor of self-determination, self-will, and selfhood in desire and the advent of solipsistic separatism in body: They see each other as other, their bodies as obstacles to entire interpenetration, and they concentrate on parts that are therefore now become private, shameful and in want of hiding (9.1090). They have, to use Milton’s word for the music of Hell, become “partial”: particular in taste and partisan for themselves.

Now first Adam turns, in a bad moment, from an easy assumption of superiority to misogyny. He wishes that God had stopped his creating after the “Spirits masculine” of Heaven and before making “this novelty on earth” (10.890), a female; of course he doesn’t know that angels are transsexual at pleasure (1.423); oddly enough Hell proper really does seem exclusively masculine.

So there are these degrees, from love to lust: the total merging of angelic congress, the selfless closeness of the paradisaical union, then the choosy separation of fallen sex—and a last grade, the unassuageable desire of loveless, lonely Hell, that seems to have no female but Sin.

Thus the eating and the fruit’s operation are one: separation. The transgression and its punishment are one: schism. Their obliquity and the skewing of their world are one: sophistication—that is complex and varied knowledge in

a world of polarities. At least, so it seems to me. What I wonder about is if it doesn't all start with Adam's little prelapsarian lapses: Does it begin when he asks God for a companion? When he fails to take Eve's Satan-inspired dream seriously? When he gives Eve—as God gave him—the freedom to disobey, although he has been warned? Were there Adamic falls before Eve's great Fall? Yes, but he doesn't have it in him to sin greatly.

But then arises a much more momentous question: Is *the* original sin that starts our way of being, Eve's Eating of the Fruit, a bad thing? This consideration is the crux of this piece. But first one more Miltonian intricacy.

9. Original Siring

There is no female birth-giving in this poem (excepting, if you like, Sin's, whose monster-children keep creeping back into her womb, 2.795). The birth of human children takes place out of Paradise. In Adam's last hours in Paradise Michael shows him the prospect of human history in ever more foreshortened overview, up to the Second Coming (Books 11–12), while Eve, not only the “mother of mankind” by ordinary generation but also the bearer of the “Seed” by which the “greater deliverance” is to come (12.600), is sent to sleep and given a separate view, once again, in a dream—a remarkable locution, by the way, this recurrent reference to her remote progeny, Jesus, as “the Woman's Seed” (e.g. 12.542, 601), for he is indeed begotten without male insemination.

So whatever her condition when Paradise is lost, whether the first offspring is engendered on that racking last night in sin or before that yet in innocence, or afterwards in their new world, there are no women's births before the fall: As he is henceforth to labor in the sweat of his brow in the fields, so she is to labor in unparadisaical pain in childbirth (10.193).

But there are plenty of male sirings, firsts of their kind and strange, in Heaven, Hell, and Paradise. God *begets* a son

(5.603) having *made* the angels—geneses of which the human imagination cannot conceive. One angel—Satan—doubts his creation; he thinks he might be spontaneously generated, self-created, though he doesn't know how (6.853). As Zeus gives birth to Athena, so Satan gives birth to Sin from his head. She is his brain child, born from the seat of reason, in him a source of perversion. Soon he has congress with her, his daughter and wife, who bears Death, who in turn rapes his mother (2.747). Adam is formed from dust in God's image—who is however not an imageable original, being in his nature invisible. Eve is, not unlike Sin, born from her wombless progenitor's body, not from his head but from his sinister side (8.465, 10.885), as a body part; hence she is at once apart and, somehow, also a lesser image of his entirety and of God at a remove. She is—strictly speaking—at once Adam's offspring and his consort; like Oedipus's fratricidal sons, one, though not both, of her children will kill the other, earth's first murder (11.445).

Are these origins, these firsts of begetting, creating, imaging, producing, even intended to be closely inquired into? Are they just the hapless by-products of making theological mysteries into poetic pictures in which the *supernatural* cannot help but appear as *unnatural*? Or are they meant to be dangling perplexities, intended subtexts of questionableness, reflections on the consequences of entertaining nightly a Muse that tells of geneses beyond Nature?

10. Eve's Happy Fault and Salutary Fall

Back to the great perplexity—the way the poem puts itself in question: The angelic crew falls into a hell that will at the end of time be sealed for eternity. The mortal pair wanders into a world that is “all before them,” a world spaciouly various in places, and eventfully progressive in time. Is man's fall and the sin that at once was and induced that fall a bad thing altogether?

The answer No is considered by Adam himself, when the Archangel Michael shows him the future and the Final

Judgment. Then Christ will reward “his faithful and receive them into bliss, / Whether in Heaven or Earth, for then the Earth / Shall all be Paradise, far happier place / Than this of Eden, and far happier days” (12.462).

To this astounding prophecy, astounding because it announces that mankind’s posthistorical condition will exceed its prelapsarian state in happiness, Adam responds, with one last of those “good out of evil” turns: “O Goodness infinite, Goodness immense, / That all this good of evil shall produce, / And evil turn to good. . . Full of doubt I stand, / Whether I should repent me now of sin / By me done or occasioned, or rejoice / Much more that much more good thereof shall spring” (12.469).

This paradox of paradoxes, that one man’s great Lapse, that his deliberate disobedience should send mankind on the way to the greatest bliss, so that repentance itself seems redundant, has a theological name: the *felix culpa*, the “fruitful fault.” The long history of the thought and the phrase is traced in an article by Arthur O. Lovejoy, “Milton and the Paradox of the Fortunate Fall” (ELH 4.3, September 1937); it is referenced in Scott Elledge’s marvelous edition of *Paradise Lost*. The precise phrase *felix culpa* seems to come from the “Exultet” of the Roman Liturgy, which also speaks of the “certainly necessary fault of Adam,” giving a clear answer to the question of divine intention. The thought, however, goes back to the Church Fathers. Ambrose, Augustine’s bishop, spoke of the *fructiosor culpa quam innocentia*, “the more fruit-bearing fault than innocence,” and Augustine himself says straight out that God “wisely and exquisitely contrived” sinning so that the human creature, in doing what it itself wishes, also fulfills God’s will—a generalization of the original sin.

Milton is said probably to have known this patristic tradition. It seems to me that this notion, to which I referred above, that the experience of vice is the necessary antecedent to fully operative virtue, is along the same lines.

Now here is something remarkable: In all of Lovejoy’s quotations, including the little apple ditty copied above (Sec. 4.), it is Adam’s fault, Adam’s apple. Milton himself begins *Paradise Regained*: “I who erewhile the happy Garden sung, / By one man’s disobedience lost, now sing / Recover’d Paradise to all mankind.”

But it’s not one *man*’s disobedience. Though he is the apple taker, she is the apple giver, hers is the literal original sin—if priority now, under the *felix culpa* doctrine, bestows a certain credit. Hers is the first fault, for better or worse. Satan seduces her first, she Adam; his is a very secondary apostasy. Satan sins aboriginally as Hell’s native; Eve sins by seduction, as Paradise’s malcontent; Adam sins derivatively, as Eve’s husband (10.2): “She gave me of the tree, and I did eat” (10.143). In fact for God this sinning at second hand is an extenuating circumstance for humans.

Indeed, Eve tries to accept full responsibility and all the punishment (10.934). Adam reproves her, God seems to agree: “Was she thy God. . . that to her / Thou didst resign thy manhood. . . ?” (10.145), but she is undeterred (12.619). And so is Milton, it seems, implicitly and explicitly: implicitly, in making *her* book, the book of her absconding from domestic Adam, the high point of the drama of the epic, with its modulation to tragedy, according to its own invocation (9.6); explicitly, when Michael, explaining why man is now in looks more Satan’s image than God’s likeness, terms the disfigurement “inductive mainly to the sin of Eve” (11.519).

So which is text, which subtext here? Eve is the original sinner, and her sin is fruitful; she is, in fact, the Mother of the Seed. She is, moreover, much more disposed to disobedience than he, so why isn’t the Fall *her* drama? Isn’t it indeed so in this poem where the events are vividly enough seen to blanch out an old tradition in Adam’s favor—so to speak?

A disclaimer, lest these observations be imputed to me for feminism. I’m not much for Eve. Her badness is bad: Her adventurousness is feckless, her careless disobedience immature, her rebelliousness shallow, her susceptibility to

flattery foolish, her avidity for stimulation reckless, her appetite for Godhead clueless, her lies to her husband ugly, and her argumentation too smart by half. It is not Eve I admire but Milton, for his second sight in knowing how qualities connect, and then, now, and always make up into a human type (of either sex) which I think of as characteristically modern—vivid and endangered and *very* familiar to a teacher.

Besides, it isn't even quite clear what she did for us. Under the *felix culpa* doctrine Satan is an unwitting *agent provocateur* for Heaven, but the Almighty in fact contradicts this in a speech from the Throne: Let man, he says, "boast / His knowledge of good lost, and evil got, / Happier, had it sufficed him to have known / Good by itself, and evil not at all" (11.86). This contrary doctrine jibes with a promise we have heard earlier: Raphael, having transubstantiated a meal of paradisaical fruit, explains to Adam how this nourishment "by gradual scale sublimed" can raise man's embodied soul through degrees to full reason—"and reason is her being." For the soul is the same in kind as the angels' though less in degree, since man's reason is mostly discursive, the angels' intuitive. So then, "time may come when men / With angels may participate," and find that "from these corporal nutriment perhaps / Your bodies may at last turn all to spirit . . . and winged ascent / Ethereal, as we, or may at choice / Here or in heav'nly paradises dwell; / If ye be found obedient" (5.483).

An amazing promise, though hedged: The route to Heaven is through diet and obedience! Thus the Fall achieved just a long detour to the same end: a choice of goods, either of a dwelling in Heaven or an etherealized life in Paradise. And Adam actually knew this before the Fall, as did Eve who had been listening in! We do not hear much more about it. Perhaps, we may surmise, the prospect of man etherealizing directly from Paradise to Heaven is embarrassing to the Father, for it leaves the Son without his salvific mission.

So has Eve, in causing history, launched mankind on its necessary road or on a futile byway? And did Milton intend to throw such doubt on the need for the Son's self-sacrifice, his entering history as a man?

11. Wisdom Without Their Leave

"The world was all before them, where to choose / Their place of rest, and Providence their guide: / They hand in hand with wand'ring steps and slow / Through Eden took their solitary way." With this solemn iambic saunter, sad but comforted, bereaved but hopeful, the divine epic ends and human history begins. Yet in the very last of these ten-thousand five-hundred and fifty-six lines there lurks still one more provocation to stimulate the intellectual sensibility like a dissonance in music: "solitary." Does it mean "alone"?—but they have a Guide. Does it mean "single"?—but they are a Pair. Does it mean "at one"?—but her "meek submission" (12.597) is dearly bought and perhaps not so very reliable or heritable (moreover it's not a meaning in the OED). Or could the word perhaps intimate that this same sole humanity is about to end, that in the poem Cain was perhaps conceived on that first and last night—or afternoon—the first of the "contagious fire" of "foul concupiscence" (9. 1035, 1078) and the last on their "native soil" (11.269), in their Paradise—Cain the first man born out of Eden, at once the first murderer and the first city-builder (*Genesis* 4:17).

If Milton's last lines intimate something obliquely but precisely, something beyond the general hopefulness of the opening of a wide land and a new era, namely the incipient first *natural* birth on earth—a thing of course unprovable—then not two only but a future three are leaving Paradise, and history with its highway and so crucial byways has already begun. For Cain's generation is a false yet necessary start. It is the main cause of the Flood in which it is itself destroyed. Yet it is the indirect cause of God's covenant by which the earth is forever safely populated, for from Noah's sons "was the whole Earth overspread" (*Genesis* 9:19), and among their

progeny was one Javan, the ancestor of the Ionian Athenians, our Ancients. But that is a fantasy in the spirit of the two new books (11-12) of prospective history that Milton added to the second edition of *Paradise Lost* (1674). The point is that here might be one last exemplification of that derivation of good from bad that informs the poem and makes one think.

And so we did, all of us, think about this question in the seminars that incited these reflections, but perhaps the daughters of Eve in particular. One form of the recurrent question was: What would we have done, what do we do and shall we do, and, above all, let our young do, in the face of Satanic temptation? By "Satanic temptation" I mean the Serpent's promise of a riskless transgression, of acute experience, of our equalization with the gods to attain "Wisdom without their leave" (9.725). Do we owe it to ourselves to yield to temptation? The angels in Heaven evidently know good from evil without being affected by evil; they heard the report of man's lapse "with pity" that "violated not their bliss" (9.25). The Angels in Hell know evil and violated bliss in its grand pathos and deep misery. Milton preaches in the *Areopagitica* that we humans must know vice practically and previously to virtue to be capable of vital goodness.

If we permit, even encourage, the transgression of the intellect—Satan's temptation of Christ, resisted by him, to liberal learning and philosophy—and also of the senses—the "artificial paradises" of Baudelaire, drug-taking and similar stimulation, to put it plainly—are we realizing a plan inherent in our postlapsarian mortality? Unlike our Original Parents, we are born as babies and grow laboriously into our adult state, so we have no cause to be as cluelessly innocent as they of the substance of sin and the meaning of the punishment. Moreover, on earth it is required not only that prohibitions be clearly promulgated but that they define an intelligible crime, and that the punishments be understandably formulated before we are answerable—the reverse of the order under which Eve commits the "mortal sin / Original"

(9.1003). She knows what death, the punishment, is only after she has sinned: It is, as she puts it with brutal brevity, "I extinct" (9.829); before that it was "whatever thing death be," as Satan expresses for her the sum of her knowledge (9.695). And, I think, she never quite learns wherein the badness of the forbidden fruit lies beyond the fact that it is forbidden.

But perhaps that really is the meaning of the *felix culpa*, the fruitful fault: It is at once a first exercise of autonomy, expressed as mere disobedience, and the first lesson in its fruits, felt as potent wisdom. The poet of *Paradise Lost* seems to intimate that we might do well to opt for transforming experience over psychic intactness, to be adventurously bad with Eve rather than stodgily good with the angels. But it is not, I think, what he would agree to having said.

Postscript:

Two of the very problems considered in this essay, the intellectuality of pre-lapsarian man and the real cause of the Fall, are raised by Maimonides in the *Guide of the Perplexed* (1.2; translated by Shlomo Pines, 1963).

He finds this way out of the problem of Adam's knowledge: before the eating he knows True and False. The evidence is in the fact of the commandment itself, for its prohibition requires apprehension by the intellect. But for inclining toward the desires of the imagination (which is the villain organ for Maimonides) and the pleasures of the senses, Adam "was punished by being deprived of that intellectual apprehension" of True and False, and was instead "endowed with the faculty of apprehending generally accepted things [that is, common notions]." Thus, "he became absorbed in judging things to be bad or fine [that is, Evil or Good]."

This is certainly an ingenious explanation of the original nature and subsequent change in Adam's intellect, though it is neither hinted at in Genesis nor imagined by Milton (who

does not endow unfallen Adam with much philosophical intellect) that what he lost was intellectual certainty and what he gained was conventional morality.

As for the cause of the Fall—imputed by Maimonides to Adam alone—it was that Adam was *greedy* and followed his imaginative and carnal appetites. His punishment, “corresponding to his disobedience. . .measure for measure” is that he was deprived of good things to eat gotten without labor and compelled to feed on the grass of the field in the sweat of his brow (15a).

So here Maimonides is as equivocal on the point at issue as is Milton: was the root of the transgression disobedience or desire? (Many thanks to Barry Mazur for the reference.)



Going in Silence

Abraham Schoener

I tried to explain to a February Freshman why our basketball games here at St. John's have five quarters. I was not very successful. It made plain to me how much we live in a queer world of our own making. The same is true of the heroes in Homer: they live in a very queer world, but it is a *world*—a thriving whole, in which part answers to and contends with part, in which each individual represents the whole and the whole nurtures and challenges each individual. And it is a whole of their own making—from the hollow ships to the earthen walls to the roaring sea to the aromatic sacrifices, even to the gods above and among them. I am not going to justify these claims here; I only pause to suggest to you what makes me believe them.

How could the heroes have created the inexhaustible sea, the sea that carries them from port to port, the salt sea, the wine-dark sea? Let me say only this: once the sea has become “wine-dark” for them and for us, it is our *sea*. We name it by one of our own creations, a creation that requires not only a certain level of human intervention into the workings of nature, but a creation that is most present to us in our own *social* activities—in meals, sacrifices, celebrations. The sea called “wine-dark” is now part of this, *our* social world. This is equally true of Homer's other words for the sea—the “salt-sea” is the sea whose water we have tasted, the taste we feel in our mouths—the sea, once again tied to our food, our meals, our habits of seasoning.¹ Through habits no different from these, the heroes have created their world.

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Their gods, however, we are only too happy to conceive as human creations. There is nothing in the *Iliad* to support this; all of its language points toward the contrary. In particular, Zeus is called the “father of gods and men” in order to show that he is the condition for the existence of both the other gods and men, of the heroes in particular. So let me rephrase what I said about the gods above: we should be unwilling to see them as the *creations* of mortal men, but we should still recognize how their continued presence in the world of the heroes depends on the heroes themselves. There are two small but important signs of this in the beginning of the *Iliad*.

In Book 5, Dione consoles the wounded goddess Aphrodite by telling her of the other gods who have been grievously wounded by mortals. It is surprising, perhaps shocking, to learn that Aphrodite’s wound at the hands of Diomedes was not some amazing and unique transgression of an immutable boundary, but only one in a series of impudent, and *successful*, human assaults upon the immortals. Two incidents stand out in my memory of these tales: Dione says that Diomedes had attacked Hades—the king of the realm of the dead, a figure I had always thought of as dead himself, a mere shade—and wounded him severely and painfully. And lest we think that only gods like the unsubstantial Hades and delicate Aphrodite are subject to these attacks, Dione tells the story of Ares, the god of war, who was set upon by two heroes, trussed up, and stuffed into a huge brass jar for thirteen months, as if he were a lost Jinni from the *Arabian Nights*. Dione is clear about the consequences of this imprisonment: she says, simply, that if a certain mortal woman had not heard his groans and freed him, he would have perished. (5. 380 ff.) This suggests a possibility that Homer never makes explicit: the gods are subject to starvation. We could bottle them all up, forget about them and so starve them to death. Their place in the world of the heroes is not guaranteed. It depends upon a certain kind of attention, an attention of which Zeus is deeply conscious. He says to Hera:

For of all the cities of earth-bound human beings that stand beneath the sun and the starry vault of the heavens, the one most honored in my heart is sacred Troy, and Priam, its king, and his people—for there my altar was never without its fair share of the feast, of the poured wine, of the roasting meat. There we always got the prizes of honor due us. (4. 41-49)

This almost nostalgic speech makes me think that there are easier ways to starve the gods to death than by having to stick them into brass jars—and that Zeus is painfully aware of this. If we forget the gods at our meals, when we drink wine, at our games. . . .

* * *

This is not the heart of what I want to discuss. I only wanted to suggest to you that the world of the heroes is much like the world you have entered here—a world of traditions, of traditions that are largely our own singular invention, of traditions supported only in our common and constant activities of talking, eating, celebrating, playing.

Singular as this world may be, it need not be in any way cut off from larger spheres, different worlds. For instance, I will now appeal to the world of Homeric scholarship, a world in which the rigors of Freshman lab are unknown, in which the population is too innocent to tremble at the name of Kant—a world that might seem to discourage the interest of us amateurs. Bah! I say. It is a world in which I have learned things and had fun. I recommend it to you.

Any Homeric scholar, no matter how much of a Freshman in the field, will be able to tell you right away that Homer has two words for “silence,” *siopei* and *sigei*, and that he never uses them as the subject or object of verbs but that they occur *only* in the following construction: “*in* silence.”²² This is the subject of my essay: what does Homer mean by

“silence”—in particular, what does it mean that Homer only speaks of silence as that *in which* something else takes place?³

In attempting to answer this question, I will draw only on the one fragment of a text that we all have in common: the *Iliad*, Books 1 through 5. But this is no deprivation for us; rather, even in this small piece of a text there is more in the way of riches than we could ever appropriate, much less digest. In the face of these riches, I will bluntly, almost without discrimination, reach out for one of the gems that shines most brightly, the beginning of Book 3:

Now once each of them had been put into order, each with his captain, then the Trojans went out in clamor and shrieking, like birds—just as the clamor of cranes before the face of the sky, when they flee winter and its endless rains, and they fly toward the streams of the Ocean, all with a great clamor, and bring bloodshed and destruction to the men at the source of the Nile. And so these cranes are surrounded by evil strife, even from the break of day—

But the Achaians went out in silence, breathing strength, each one eager to defend and protect the other.

The contrast here is so striking that it could mislead us. If we did not proceed with the greatest discrimination, we might immediately infer from it that the Greeks and Trojans were completely different races, almost different species, and, further, that Homer much prefers the Achaians to the Trojans, since he compares the latter to squawking birds but treats the former with great and simple dignity. Let us sift through this passage carefully.

We should recall that this description is immediately preceded by the strange, nearly endless, enumeration of all the battalions fighting at Troy. The enumeration seems to be entailed by two parallel, but not identical, pieces of advice

offered to the Achaian and Trojan generals by the wise elder of each side. After the Achaian host has shouted its assent to the counsel of Odysseus—that they should stay and continue to fight for the capture of Troy—Nestor suggests to Agamemnon that

[H]e separate the warriors by tribe and by brotherhood, so that brotherhood can bear aid to brotherhood, and tribe to tribe. . . Then you will know who among the chiefs and who among the troops is base, and who is brave—for each group will be fighting by itself. (2. 362 ff.)

This seems to be Nestor’s idea: the Achaians have been fighting in ranks as organized as they ever will be until now, but they have been all mixed together, as if they were all one tribe. But they are not: Achilles’ withdrawal has already made that clear. If they now fight tribe by tribe, it will be easy to assign honor and shame to the particular groups that particularly deserve each. This might eventually result in a new principle for the division of the spoils, but Nestor does not mention this. It might lead to even more contention in assembly, but Nestor is surely thinking that it will spur the troops on in battle, urging each group to exceed the accomplishments of the others.

This division into tribes makes the catalogue of the Achaians a possible and even logical, if not gripping, part of the narrative. This division is also the condition for their eventual approach to battle, going in silence.

Now once Homer finishes his enumeration of the Achaian tribes, he switches his attention suddenly to the Trojans. He says that, at this time, they were holding an assembly by one of the gates to the walled city, but he tells us nothing of what they were saying. Instead, he describes how Iris, a minor divinity thinly disguised, approaches the Trojan king Priam and his son Hector and gives them the following advice:

Since there are so many foreign allies throughout the great city of Priam, and since one language is not the same as another among human beings scattered all over like seeds—because of this, let every leader give orders only to those whom he has led here, and once he has ordered for himself his fellow citizens, let him lead them forth. (2. 804 ff.)

Hector receives the voice and immediately disbands the assembly before we have heard the exchange of a single word. Now this divine advice has the same effect among the Trojans as it did among the Achaians: the men end up ranged for battle according to their tribe and place of origin, and so Homer catalogs them just as he did the Achaians. But we should attend to the great differences here: it looks like many of the “Trojans” are in fact foreign allies, sufficiently foreign that they do not all speak the same language. They are thus separated so that they do not continue to confuse each other, but no special care is taken to unify them. The Achaians are all set against each other in contention for the prizes of glory; but this very contention will unite them in the same task. They will all naturally seek the same end, and their quests are not mutually exclusive but mutually assisting. The face of battle is so vast and so varied that many of the tribes can win great glory at once, and the more each damages the enemy, the easier will be glory for all.⁴ But the Trojans, now divided into battalions with no means of sure communication between them, are isolated: they are neither pitted against each other in contest, nor capable of joint action. They are already fractured, even before they enter the battle, and reduced to fighting the way a pack of dogs must fight, with only barks and growls, or shrieks of terror, not words, to communicate.

But even this great difference does not explain why the Achaians would go to battle in silence. We must go back

almost to the beginning of the book and retrace the way the Achaian host behaves when it acts as a whole.

We should notice that when Achilles first calls the host to assembly, this gathering is presented as nothing remarkable. Every man takes his place, the whole is orderly and quiet, and any man may approach the center and speak to the whole. Agamemnon may well dominate, but he has neither exclusive right to speak nor the right to decide who speaks. But the assembly is not a model of thoughtful discussion. Achilles and Agamemnon insult each other, and Agamemnon treats Achilles so bitterly that he almost curses the assembly with the slaughter of its king. When the gathering is finally dissolved, Achilles has withdrawn from the host, Nestor has been ignored—and if I had been seated among them, I would be glad that this open forum for group discussion was now over. This bodes badly for the Achaians’ future ability to work together and makes their silence look like failure of speech—not an act of strength or resolution.

* * *

The return of Chryseis placates Apollo, and health, if not peace, returns to the Achaian camp. But soon Zeus begins to carry out Achilles’ wish for vengeance, and sends a dream to Agamemnon, to lure him to disaster. The dream urges Agamemnon to rally the troops for battle, promising him that the immortals intend immediate victory for him. But as if in a sign that he needs no lures to disaster, Agamemnon decides to stir the troops to battle by conveying the opposite message to them—telling them that they are doomed to failure. This has always seemed like the pitch of folly to me, and was a cause of my despising Agamemnon further; but I think that I now see some understanding behind it, an understanding that would help restore the spirit to the host after the last disastrous assembly. Let me spell out this understanding in detail.

As soon as he wakes, Agamemnon has the heralds summon the host to assembly. But on the way, he seems to

catch the most important leaders—"a council of the great-spirited elders" as Homer calls them—and separates them from the throng. To them he reveals his dream and his plan: he will "make trial of the men with words, as is right, and order them to flee, but you," he tells the great-spirited elders, "you hold them back *with words*" (2. 73 ff.). They agree, and all proceed on to the assembly.

There are two especially important points to notice here: the first is the use of a beautiful word, *megathumos*. I have translated it as "great-spirited", but this lacks much. *Thumos* is one of the strongest words in the Greek language, but it is hard to say what it means. It is at the heart of every hero, and perhaps of every philosopher. It is connected to strength and fury, desire and deliberation. Now *Homer* often uses this word as the epithet of the Trojans; he never bestows it upon the Achaians—they are, by contrast, prudently "well-greaved." *Achilles*, on the other hand, puts it to special use early in his dispute with Agamemnon: when he addresses the host as a whole, he calls them "the great-spirited Achaians." I do not think that this is mere flattery on his part; at this moment he thinks highly of his comrades and expects them to support him in his denunciation of the fat dog-king. But soon it is clear that they will remain voiceless, mere spectators; and that he can have no revenge through the spilling of Agamemnon's blood. But even worse, Agamemnon picks up Achilles' use of the word and uses it to address the host in response. But this time, he casts it back in their faces as a taunt. In answer to Achilles' suggestion that Agamemnon give up Chryseis and be rewarded with another prize later, Agamemnon says:

So if the great-spirited Achaians give me a prize,
having fitted it to my own spirit, so that there will
be equal exchange—then fine! But if they do not
give me this, then I will myself come and seize
what I want—whether it is your prize, Achilles, or
Ajax', or Odysseus'. (1. 135 ff.)

He thus uses Achilles' compliment to threaten and humiliate them, clearly foreseeing that neither Ajax nor Odysseus, nor any of the other "great-spirited Achaians" would resist him. And he is right: only Achilles trembles with anger and reaches for his sword. This taunt must have been a great source of shame for the heroes, but still they stayed quiet.

Now having witnessed this humiliation of his comrades, Achilles returns his huge sword to its sheath and speaks in a different voice: "You heavy with wine, you with the face of a dog but the heart of a doe. . . you folk-devouring king—you rule over men *worth nothing*: for otherwise, Son of Atreus, you would be committing your last acts of insolence *now*." (1. 231 ff.)

With this, he pledges his withdrawal and throws the scepter, a symbol for him of the Achaian concern for justice and reverence, to the ground, swearing on it now merely as a piece of dead wood. The Achaian host has gone from "great-spirited" to "worth nothing" in his eyes; its emblem is some dead wood that "never more will put forth leaves or shoots or run with sap." These are heavy words from one of the greatest warriors in the host, a man glorious in battle who rose up to help save the people from the plague that was about to destroy them. It seems impossible to me that this change in his words could not affect the warriors, from Diomedes and Odysseus, all of the way down to the nameless foot soldiers and horse feeders. No matter whether they thought Achilles was justified or overweening, their silence in the assembly—in the face of Agamemnon and his brazen taunts, and in front of their own men—this silence must have been a source of shame for them. As the first book closes, the miasma of the plague has been replaced by a different kind of stain: the whole camp now festers with the shame of its silence.

* * *

This is where I begin to see the results that may come from Agamemnon's strange plan. He calls the elders together to inform them of a plan to test the fighting-spirit, the *thumos*, of the troops. The test is a test of shame: will the men be ashamed to accept his order to break camp, or is their *thumos* so broken that they will rush to the ships? The plan could only make sense on the assumption that they will despise the order and insist on staying. But Agamemnon makes no such assumption; rather he proposes that when the men run, the elders should restrain them *with words*.

Now this proposal implies two utterly natural assumptions on Agamemnon's part: first, that the *thumos* of the elders is indeed great, so that they will be in no way tempted to go home; second, that the men will respond quickly and completely to the *words* of the great-spirited elders—in other words, that *all they needed was a "pep-talk."*⁵ The whole plan seems intended to cement the relations of Agamemnon and his lieutenants and to provide the troops with the occasion for a series of dramatic invigorating speeches by their leaders. The plan seems more and more reasonable.

The assembly gathers—but not in the same way it did at first, even in the midst of the plague.

The people were scurrying. Just as tribes of thronging bees pour out of hollow rocks, always coming in fresh waves, and they fly in clusters over the spring flowers, and some hover here, some there—just so did the many tribes of men pour from their ships and huts and make their way in throngs to the assembly. But Rumor, the messenger of Zeus, blazed among them, and urged them on—and so they began to assemble. But the assembly was completely disordered, and the earth groaned beneath the seated host, and there was an uproar throughout. Nine heralds, shouting, were trying to restrain it, if only the noise could be restrained . . .with effort, the people were made to sit, and

once they had ceased from their clamor, they were made to stay seated. (2. 86 ff.)

The assembly is practically a rabble; the people move like bees covering a field, but once they are pressed to order themselves, they begin to shout and cry. They make the same *clamor* that Homer ascribes to the Trojans at the beginning of Book III and the same "uproar" that he ascribes to the joint battles of the Achaians *and* Trojans all through the book. And this is the *beginning* of an assembly. One could hardly imagine calling *these* bee-men "great-spirited." Agamemnon's test, and the eventual Achaian march into battle, seems doomed.

Once they are assembled, Agamemnon begins his harangue, and it is a remarkable test. Following his own plan, he points out that their dream-ordered departure will be a "shameful thing to hear about—indeed even for those who are yet to be, how in vain an Achaian host so good and so huge warred a war without result, even in fighting with weaker men."

Next he expands on the difference in numbers between the armies and points out that if all the Trojans were captured and made cup-bearing slaves for the Achaians, there would still be only cup-bearer for every ten Achaians. Then, as if their spirits were not yet utterly broken by imagining the contempt of future races, he says:

In fact, nine years have passed, and the timbers are rotten in our boats, and the ropes have frayed utterly, and, *I suppose*, our wives and infant children are awaiting us in our halls.

Of course, if there were any infant children around, they would not belong to the warriors—and what chilling effect Agamemnon's "I suppose" must have had! The heart of each man must now be turned home with such longing and eagerness that no desire for glory, nor martial shame, could restrain it. And so Agamemnon closes his test thus: "All right then, we should all obey—just as I say. Let us escape with our

ships to our dear homeland—for we will assuredly *never* take Troy and its wide streets.”

The results of this cruel speech are utterly predictable: the assembly dissolves and the men fly to their ships, and with only increasing momentum, the men are on board, and some ships are already in the bright salt sea. Homer says: “Then the Achaians would have had their homecoming, but beyond what was fated.” (2. 155)

Before we consider what prevented this homecoming, we should attend to a striking development in the language of the poem. You will have noticed a certain abundance of wonderful similes in the *Iliad*; the simile of the bees is an instance of these. You will have noticed that they seem to compare the events of the battlefield to moments in the world of nature, especially to bucolic scenes of mountains and farms, and that many of the comparisons seem odd. Let me point this out: there is not a simile in the book until the bees appear in Book 2, but this simile is only the beginning. Once the troops hear Agamemnon’s speech, Homer compares the Achaians in swift succession to waves whipped by the wind and to a wheat field knocked down by a gale; then, before they eventually march in silence, he compares them again to the sea, to fire, birds, flowers, and flies in a barn. But once the Achaian begin marching, Homer describes them directly, without simile—but then suddenly, for the first time, he compares the Trojans to birds. We will soon understand the reason for this development.

* * *

Now the Achaians do not win their homecoming because of a remarkable series of actions by Odysseus. While the others rushed to their ships, he, perhaps alone, did not move—“for a great pain had seized his heart and spirit.” Athena came to him and spurred him to prevent the sudden departure, and when he heard her voice he began to run. Now Homer says that when he met another leader, he spoke

to him gently and either informed him of reminded him of Agamemnon’s stealthy plan, and urged him just to sit down, and to seat his followers with him. But when he met a warrior who was not a leader—and not just a horse-feeder, but a true warrior—and found him making noise, he would strike him with the great scepter of the Achaians, make him sit down and would shame him, calling him “not worth counting, neither in war nor in counsel.” And Homer says: “And so they rushed back to the assembly from their ships and huts, with a roar, as a wave of the much-resounding sea thunders along a great beach, and the sea roars.”

We should note first that Agamemnon was perilously wrong in his two assumptions: neither were the elders so strong of spirit that they could withstand his test—only Odysseus did not move; nor did the troops need only a pep-talk to prepare for their next attack. They were desperate to leave and many, even warriors, needed beatings from great Odysseus just to sit still. This suggests that the *thumos* of the whole host was nearly broken, and that Agamemnon had no understanding of its true state. Even Odysseus and Nestor must have misunderstood its condition, or have been terribly weak in spirit, for neither of them—in fact, none of the “great-spirited elders”—had objected to Agamemnon’s foolhardy plan.

Now we must also note that the state of the restored assembly is still far from encouraging: it is not even like tribes of bees, but like the wild and inanimate sea, roaring incessantly and without meaning. We might wonder, who could speak helpfully in such an assembly?

In answer to this, Homer offers us Thersites, an ugly and impudent hunchback. We must be very careful of not taking him as some kind of stock comic character. He rises up, lame and misshapen, and hurls abuse at Agamemnon. We must now notice how close he is in this respect to brilliant Achilles. He accuses Agamemnon of keeping them in Troy only for his own gain and urges the troops to desert. He does not speak poorly, and perhaps he was persuasive, for suddenly Odysseus

appears at his side and reproaches him with “hard words,” and strikes him with the scepter. He hits ugly Thersites hard enough to raise a bloody welt on his back, and Homer says, “A big tear fell from him.” (2. 269)

Tears are very serious things for Homer; the heroes, especially the Achaians, let them fall when their friends are taken from them, parents let them fall over lost children. Thersites’ tear is no less serious than the rest, perhaps even more so because of his ugliness, his utter destitution of friends. Though he is here in Troy he will never have any one to cry with, nor is it possible to imagine that any one would cry if he fell beneath a Trojan arrow. Some of you know Sophocles’ play, the *Philoctetes*. Perhaps it will seem just to you that Odysseus is mistaken for Thersites by the destitute Philoctetes in the play. (5. 440 ff.)

Now Thersites’ counsel is expressed with neither elegance nor subtlety, nor can it sound very noble. But as the recent rush to the ships has shown, it expresses longings recently made public by every man of the host. These men, already reviled by the departed Achilles, now find that they have failed a test of their shame and courage. They have been tempted cruelly, failed, and now each finds himself humiliated before his neighbor. It would be hard for any of them to imagine any nobility in himself, or in his neighbor.

Then up steps miserable Thersites, who speaks the unspeakable. He presents to the gathered host the position they are unwilling to take, the depth to which they could never sink. They could flee the war, but never speak publicly with such contempt for their enterprise and their leaders. His shameless public display restores to them their own sense of shame; but even better, his public humiliation and punishment presents them with the scourging that each would consider meet for his own cowardice, and for the cowardice of his neighbor. I hate to use words like this, but I feel that Odysseus’ beating of Thersites provides a common release for the abashed and humiliated army. A sign of this is their reaction:

And the men, though they were grieving deeply, all laughed at him with relish; and thus one would say, with a glance, at the one nearest him: “Oh! Though Odysseus has certainly accomplished numerous brave deeds, leading us in good counsel and commanding us in battle—this deed, *now*, this is by far the finest he has wrought among the Achaians.”. . . So spoke the multitude.

I had always thought that this universal laugh was odd—there is not much laughter in the *Iliad*—and a little cruel and mean-spirited for heroes. I certainly never understood why the men would call this “by far his finest deed.” But now I think that the laughter the deed provides is not only appropriate but necessary, and so each warrior turns to the man closest to him, and they all share this grisly moment that helps restore their self-respect. For now as each one turns to the other, and as they *look* at each other, each one can now think of how different he is from Thersites—how noble by comparison, how like Odysseus. Thus do the Achaian warriors regain some of their great spirit.

But they are not yet ready for battle: Homer’s similes show this. After the humiliation of Thersites, Odysseus and Nestor finally give them the speeches of encouragement, and the troops are ready for them: at the end they shout in assent. But Homer compares their shout to a great wave breaking against a high cliff. One might wonder what the cliff is here—the Trojans are still far away. There is still something bootless in the fury of the Achaians.

As they draw closer and closer to battle, they win new comparisons: after sacrificing and feasting and donning their armor, they are like a forest fire, “and their gleam, shining everywhere, went up through the sky to the heavens.” (2. 445 ff.)

And once they take their place on the plain around the river Scamander, now closer to Troy, Homer compares them to

the many tribes of winged birds, geese, or cranes, or long-necked swans, [that] fly here and there, glorying in the strength of their wings, and with clamor they advance, and the meadows resound with them—just so did the tribes of men pour from the ships and huts onto the plain of Scamander; and the earth echoed terribly beneath the tread of men and horses.

It is wonderful now to feel the men, so recently not just wounded but crippled in their spirits, wonderful to feel them stretching their strong arms like swans “glorying in the strength of their wings;” terrible too to imagine the sound of their tread, the clamor of gleaming bronze armor, the uproar of their war cries. But suddenly they are like

the many tribes of swarming flies, buzzing through the farmhouse at the peak of Spring, when the pails dew with milk—in just such numbers stood the long-haired Achaians on the plain, facing the Trojans and eager to tear them apart.

And now all the illusions have been destroyed. Even as the Achaians become calmer again, from roaring oceans, to screeching birds, now to buzzing flies hovering in farm houses, near sweet pails of fresh milk, even as we sense the return of their great spirits, we must recognize the goal toward which they are moving. The humiliated, broken-spirited men were rushing home; these stronger, fire-like, swan-like, glorious men are gathering their strength in order to kill other men. For these men, the Trojans they are eager to tear apart, the flies will not be circling pails of milk.

Lest we see this all from the side of the apparently mightier Achaians, Homer insists upon one more simile. In this one, the Achaians are finally separated into their tribes and brotherhoods; this separation, I now believe, ensures not only a kind of team by team competition for glory, but ensures that standing next to each man is a brother, a cousin,

a companion from youth. No warrior is anonymous, no warrior has disappeared. Each is, I think, painfully present to his neighbor. This is the simile:

These men, their leaders ordered them, just as goatherds easily order widely scattered flocks of goats that had been mingling in the pasture, and the leaders ordered some here and some there in order for them to go into the battle.

I will say one thing about this simile: there are only two reasons a goatherd would order his goats. Either he is going to milk them or he is going to bring them to slaughter. As if to settle our hesitation, Homer compares Agamemnon in all of his glory to a great bull, the most pre-eminent of his herd. We do not have to live long in the world of the *Iliad* to know the destiny of the greatest, most beautiful bulls: they are sacrificed on the most important occasions.

I do not mean to abuse you with a tedious reiteration: of course we all know that these men are all liable to die soon—that, in a certain sense, they are here to die. But do they know it?

Let me suggest to you that this point distinguishes the Achaians from the Trojans at the beginning of Book 3. The Achaians have faced shame and humiliation, they have been teased with images of a homecoming and have turned their back on those images with their eyes wide open to what they will face if they remain. As their spirits return, and as they are calmed from the force of a sea or a forest fire to buzzing bees and docile goats, they are seeing more and more clearly what they will face. Notice the last two things that Homer says are on their minds before the battle: in Book 2, directly before the catalogue, he says “they are eager to tear the Trojans apart;” at the beginning of Book 3 “they are eager in their spirits to bring help to each other.” These warriors, whose spirits have clearly returned, are not thinking about glory, booty, even victory. Facing the Trojans, they think about destroying them in the most terrible, beastly, inglorious way;

marching towards them, hearing their wild cries, they think only of helping each other in the horror to come. The Achaians go in silence because they see what is ahead of them, because they see each other as brothers, because they still see Agamemnon's images of their wives and children. They march in a hard-won silence in awe of the world they have created and willed for themselves.⁶

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¹ Compare the whole literary history of the word *porphureos*: it surely represents something from the realm of nature in itself, not merely through our eyes or experience. But note that Homer never uses it of the sea itself (only of its waves, and even so only four times or so) and favors it instead as an epithet for something very intimately related to *us*: our blood.

² It is surely worth noting that the phrase is properly a kind of comitative dative rather than a locative since the silence names the condition—rather than the *place*—in which the action takes place. It would be awkward, though not impossible, to translate *sigei* “with silence” in order to show this. I have not embarrassed the February Freshmen with these minutiae. One might also note that the constructions occur 14 times in the first ten books of the *Iliad*, but only three times after that.

³ Silence is not properly an absence of sound, noise, talk: it is the negation or canceling of them. It takes place, but only as the result of something. It is not a negative state, but the opposite—an intentional state of fullness, a state the Achaians, especially, create.

⁴ But cf. 6. 98 ff.: it looks like the departure of Achilles is the necessary condition for any such distribution of glory. His might is so preeminent that no other can win glory when he is in the fray.

⁵ I am afraid that when Homer, narrating Agamemnon's summons of the elders, calls them “great-spirited,” he is only speaking ironically. Neither now nor when Achilles first used the word were they great-spirited.

⁶ The Trojans have not yet had an assembly because they have not been terrified. This seems to be when the assembly is most necessary. Similarly, the Trojans still make lots of noise on the way to battle: they have not yet been shaken badly enough to be quiet.